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CAT ANATOMY

Cat Anatomy: A Visual Guide to the Organs & Body Systems (PDF)

The complete illustrated guide to the feline body — all twelve systems, section by section, with labelled anatomical plates and concise notes. The full companion to the online article at vet-ebooks.com.

Contents

The 13 sections of this guide, in order.

IN SHORT

This is a visual, plate-by-plate guide to **cat anatomy** for veterinary students and professionals. We walk the whole body — **skeleton, muscles, the head and teeth, the paw and claws, every organ system, the special senses and the nervous system** — using labelled feline anatomical plates, and explain the key structures and their clinical relevance under each figure.

KEY POINTS

1. The cat is an **obligate carnivore** — its teeth, short gut and metabolism are all built for a meat-only diet.
2. A **vestigial, free-floating clavicle** means the forelimb hangs by muscle alone, so a cat fits through any gap its head clears.
3. **Claws are protractible** — held sheathed at rest by an elastic ligament and extended by the deep digital flexor.
4. The eye's **tapetum lucidum** gives night vision and eyeshine; the ears rotate ~180° and hear into the ultrasonic.
5. Feline clinical anatomy is distinct: **HCM, hyperthyroidism, CKD, urethral obstruction and hepatic lipidosis** all trace back to the structures below.

About the images

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01 The feline body plan

Understanding **cat anatomy** starts with the body plan of a small, agile ambush predator. The domestic cat (*Felis catus*) has the standard mammalian regions — head, neck, thorax, abdomen, pelvis, tail and four limbs — but everything is tuned for stealth, flexibility and an explosive pounce. Anatomists describe positions on that body with directional terms (cranial/caudal, dorsal/ventral, medial/lateral, proximal/distal) that every figure below relies on.

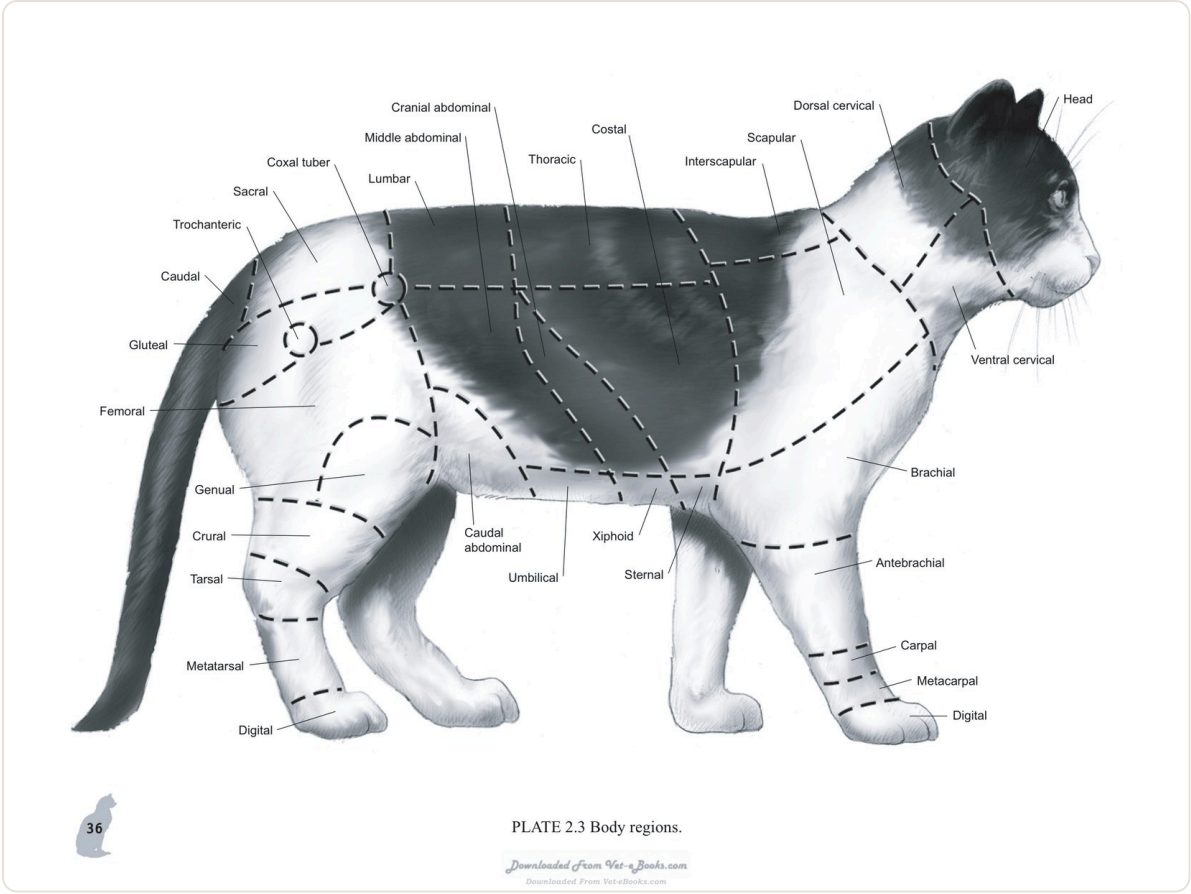

Fig 1 — Body regions and directional terms of the cat.

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The cat's low, long, flexible frame; use the regions and directions here to read every later plate.

02 The skeleton

The feline skeleton has roughly **230–240 bones** — more than a human's 206, largely because of the long, mobile tail. The vertebral formula is **C7, T13, L7, S3, Cd 20–23**. Two features define it: an exceptionally supple spine, and a **vestigial clavicle** that does not join the skeleton, so the forelimb is slung from the trunk by muscle alone. That muscular attachment absorbs the shock of landing, lengthens the stride, and lets a cat collapse its shoulders to squeeze through any opening its head fits.

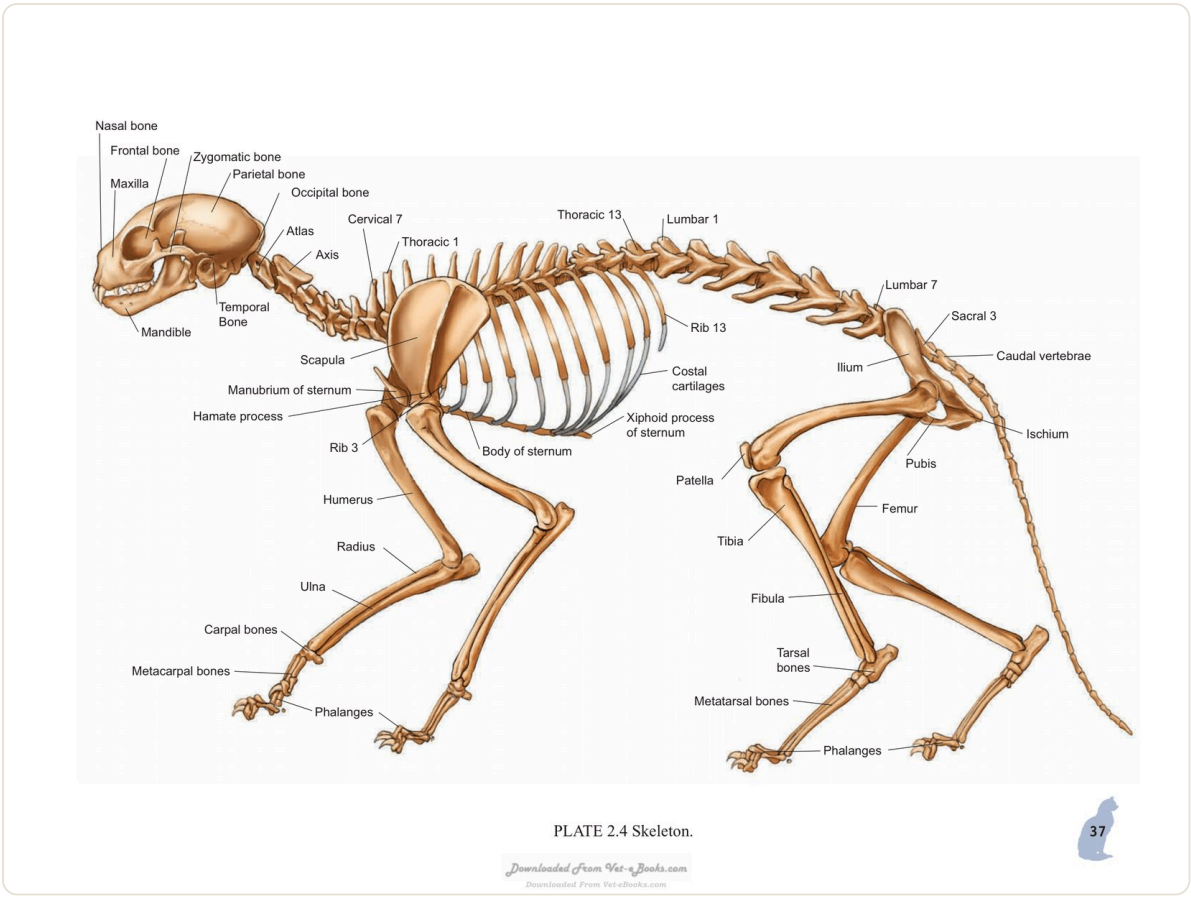

Fig 2 — The cat skeleton, lateral view.

Image — McCracken TO, Kainer RA. Color Atlas of Small Animal Anatomy: The Essentials , Plate 2.4 (p. 37). Reproduced for educational reference; copyright remains with the original authors and publisher.

From the skull and the five regions of the spine to the ribcage, pelvis and the long balancing tail. Note the small, non-articulating clavicle and the digitigrade limbs — the cat stands on its toes.

03 The head: skull, teeth & mouth

The skull is short and rounded, with large, forward-facing orbits for binocular predatory vision and a prominent tympanic bulla housing an acute middle ear. The jaw is a tight hinge (temporomandibular joint) that shears rather than grinds. The **dental formula** is 2×(I3/3, C1/1, P3/2, M1/1) = **30 permanent teeth** (26 deciduous): long canines to seize and kill prey, and blade-like **carnassials** (upper P4, lower M1) that slice like scissors.

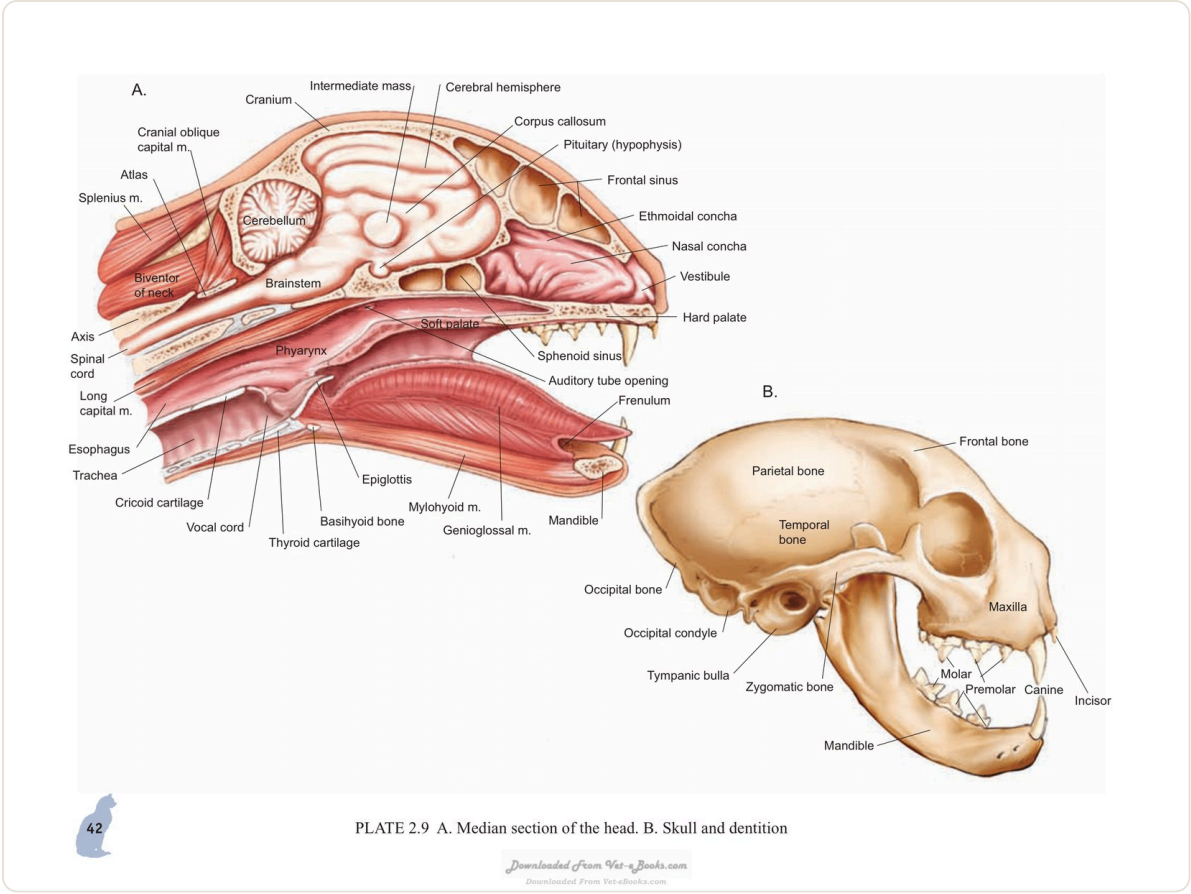

Fig 3 — Median section of the head, skull and dentition.

The nasal cavity and its scroll-like turbinates, the hard and soft palate, the pharynx and larynx, and the killing/shearing dentition of a carnivore.

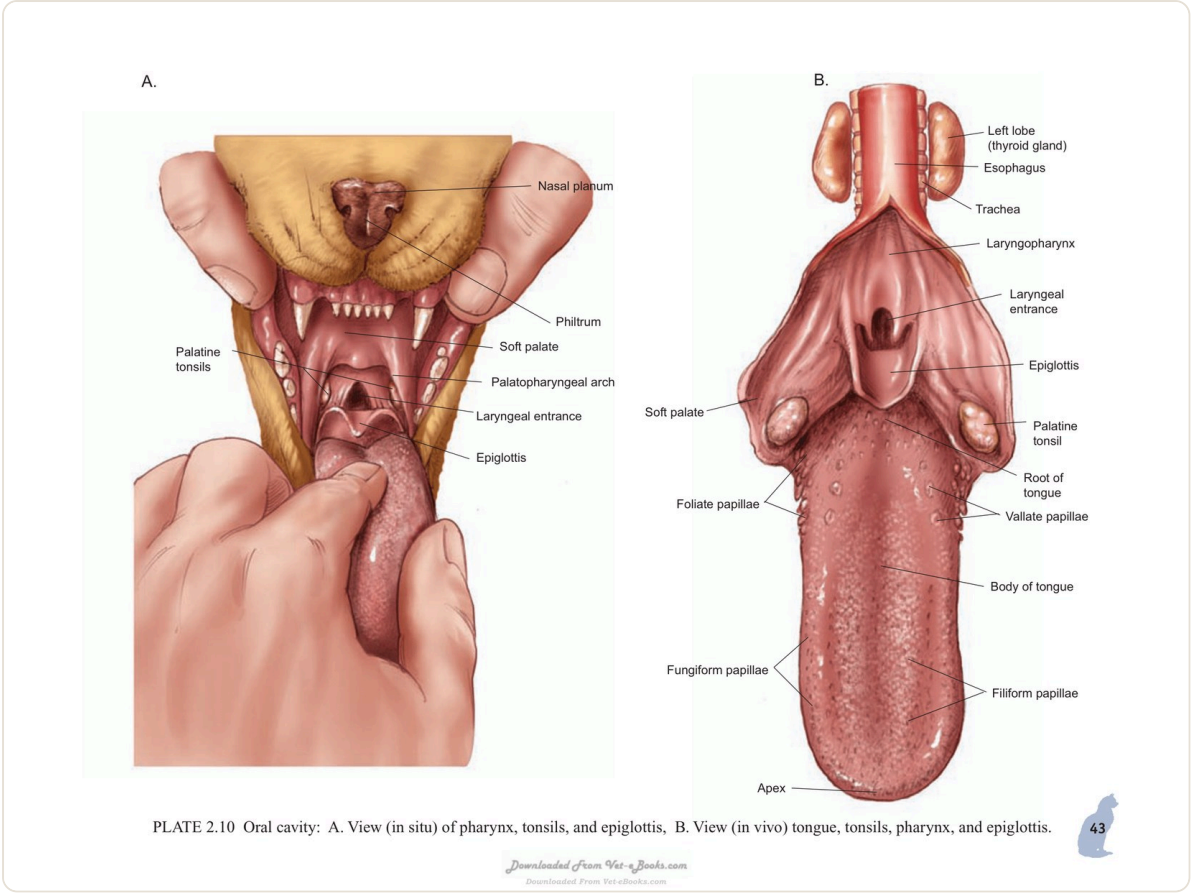

Fig 4 — Oral cavity, tongue, pharynx and epiglottis.

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The dorsal tongue is covered in backward-pointing keratinised filiform papillae — the rasping 'sandpaper' surface used to strip meat and groom the coat.

04 The muscles

Over the skeleton lie the muscles that power the hunt. The superficial layer includes the cutaneous trunci (the 'skin-twitch' muscle) and the large locomotor muscles of the trunk and limbs. Beneath it, the epaxial muscles running along the spine arch and extend the back — the engine of the pounce and the mid-air righting twist — while a muscular sling (serratus ventralis and its partners) suspends the trunk between the shoulder blades in place of a bony shoulder joint.

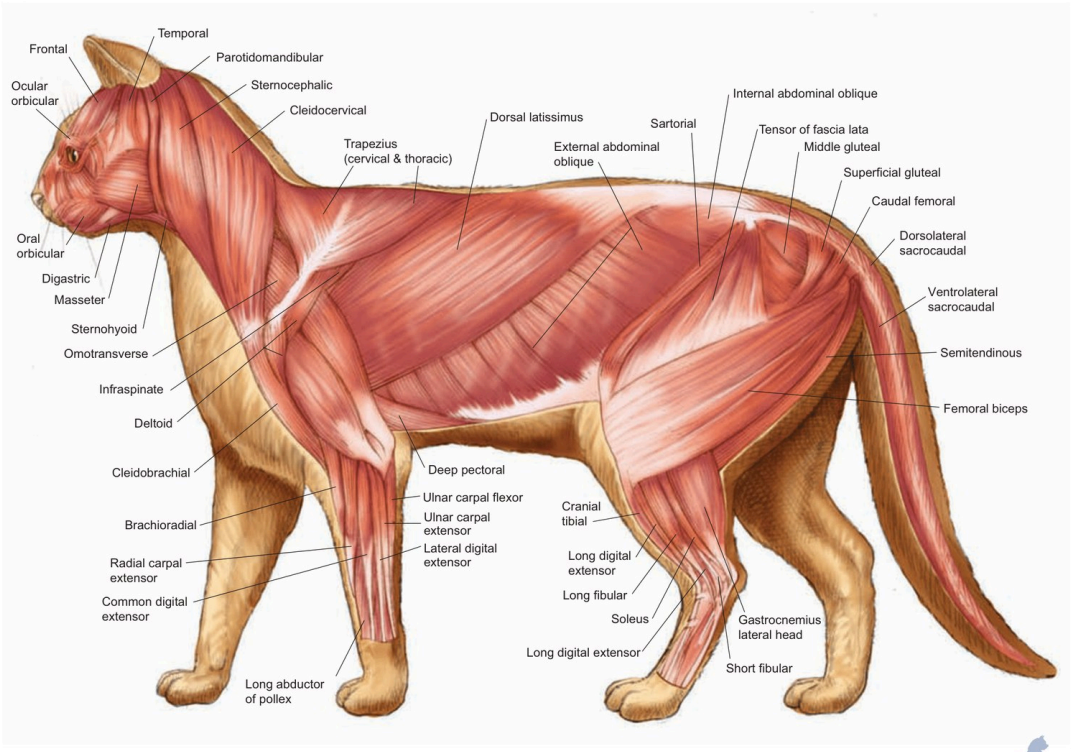

Fig 5 — Superficial muscles of the cat.

The first muscle layer: trapezius, latissimus dorsi, the deltoid and brachiocephalicus, pectorals, abdominal obliques and the hind-limb muscles that drive jumping.

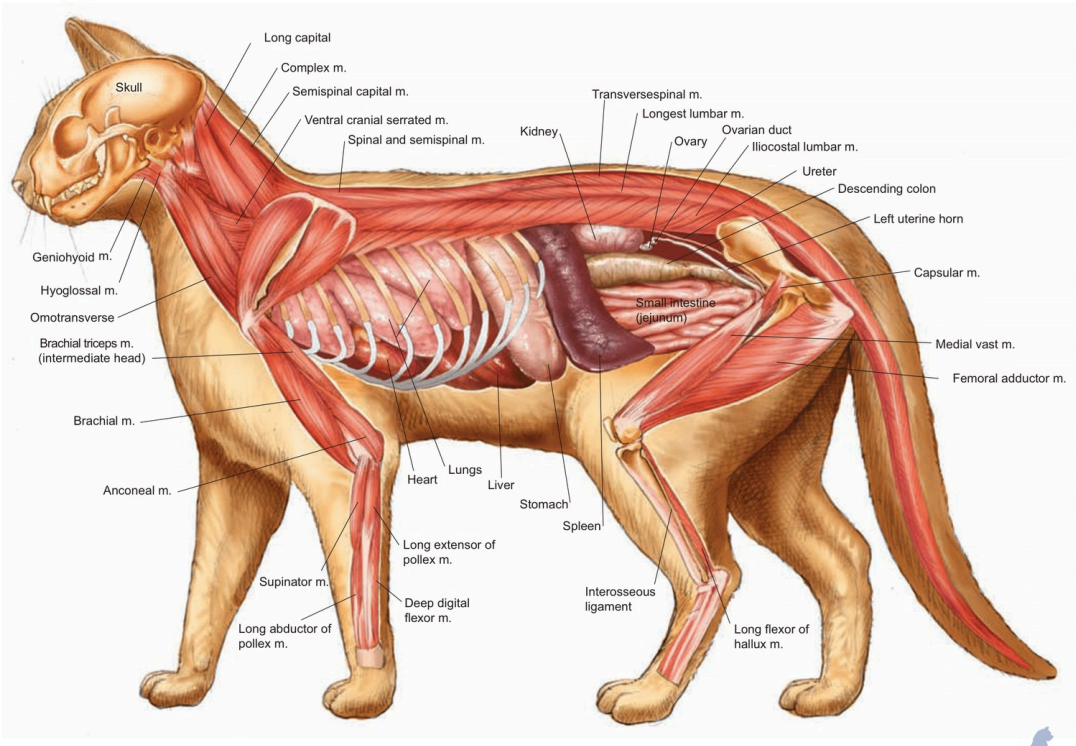

Fig 6 — Deep muscles, with viscera in situ.

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Removing the superficial layer reveals the deep epaxial muscles and, beneath them, the thoracic and abdominal organs in their natural positions.

05 The paw & the retractable claws

Cats are digitigrade — they walk on their toes — with **five digits on each forepaw** (including a raised dewclaw) and **four on each hindpaw**. Each claw grows from the last toe bone (the third phalanx, P3). At rest an elastic dorsal ligament holds the claw drawn back and sheathed; to strike or climb, the cat contracts the **deep digital flexor**, which rotates P3 downward and protracts the claw. Because the claw is part of P3, declawing is amputation of that bone — not a nail trim.

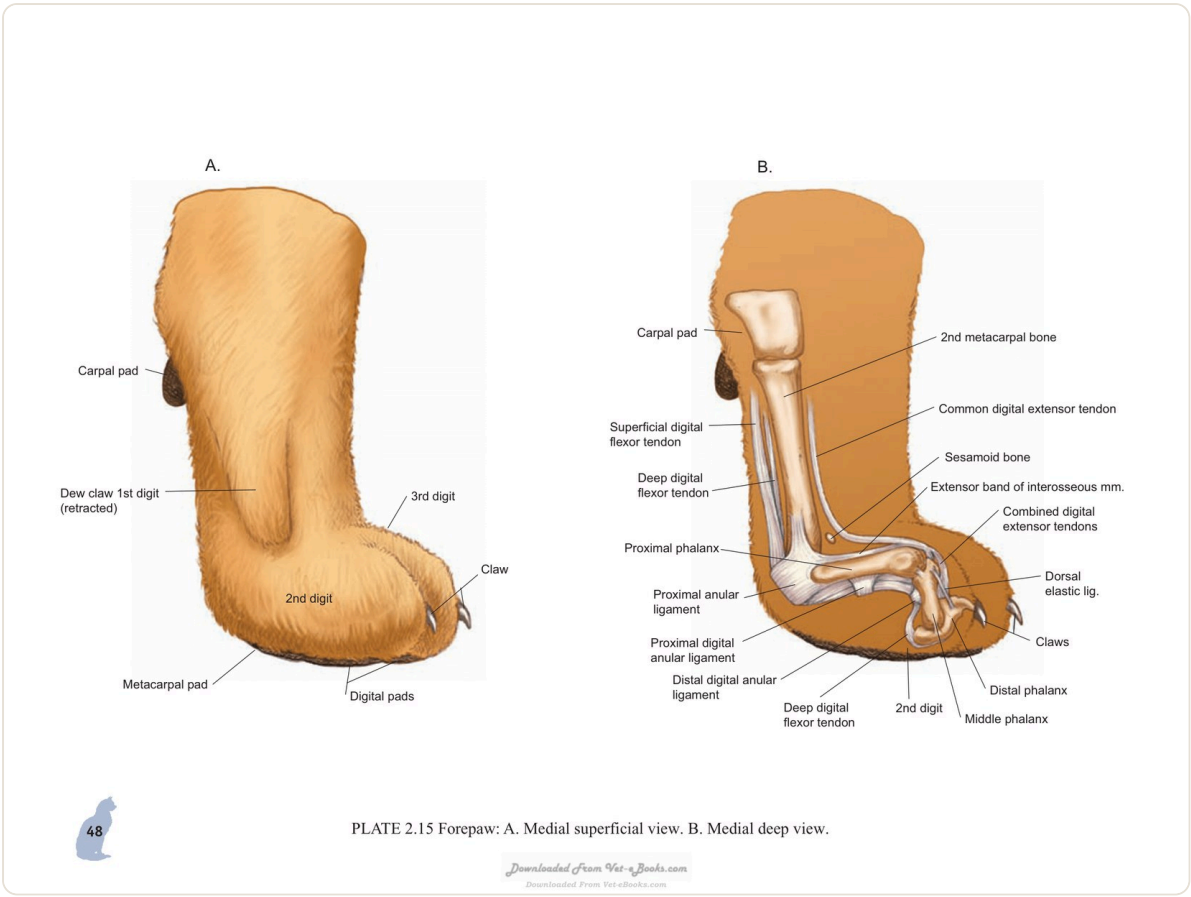

Fig 7 — Superficial and deep structures of the paw.

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The pads, tendons and the deep digital flexor that protracts the claw, plus the phalanges that carry it.

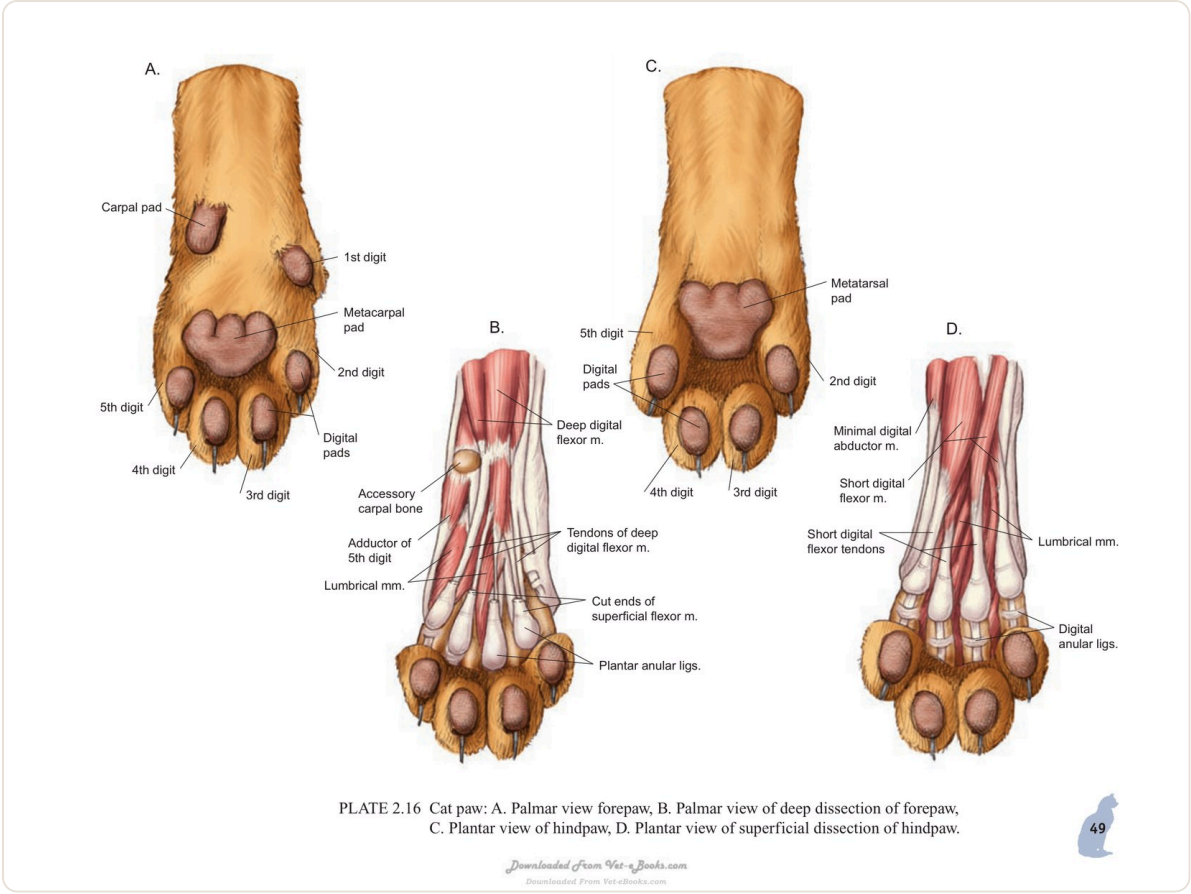

Fig 8 — Palmar and plantar views of the paw.

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Metacarpal/metatarsal, digital and carpal pads give silent, grippy contact; note the five fore- and four hind-digits.

06 Special senses: ear & eye

The cat's reputation rests on its senses, each tuned for crepuscular hunting. The mobile pinna is steered by around 32 muscles and rotates up to 180° to localise sound, and hearing extends into the ultrasonic to match rodent prey. The inner-ear vestibular apparatus underlies the righting reflex — and, when diseased, the head tilt of vestibular disease.

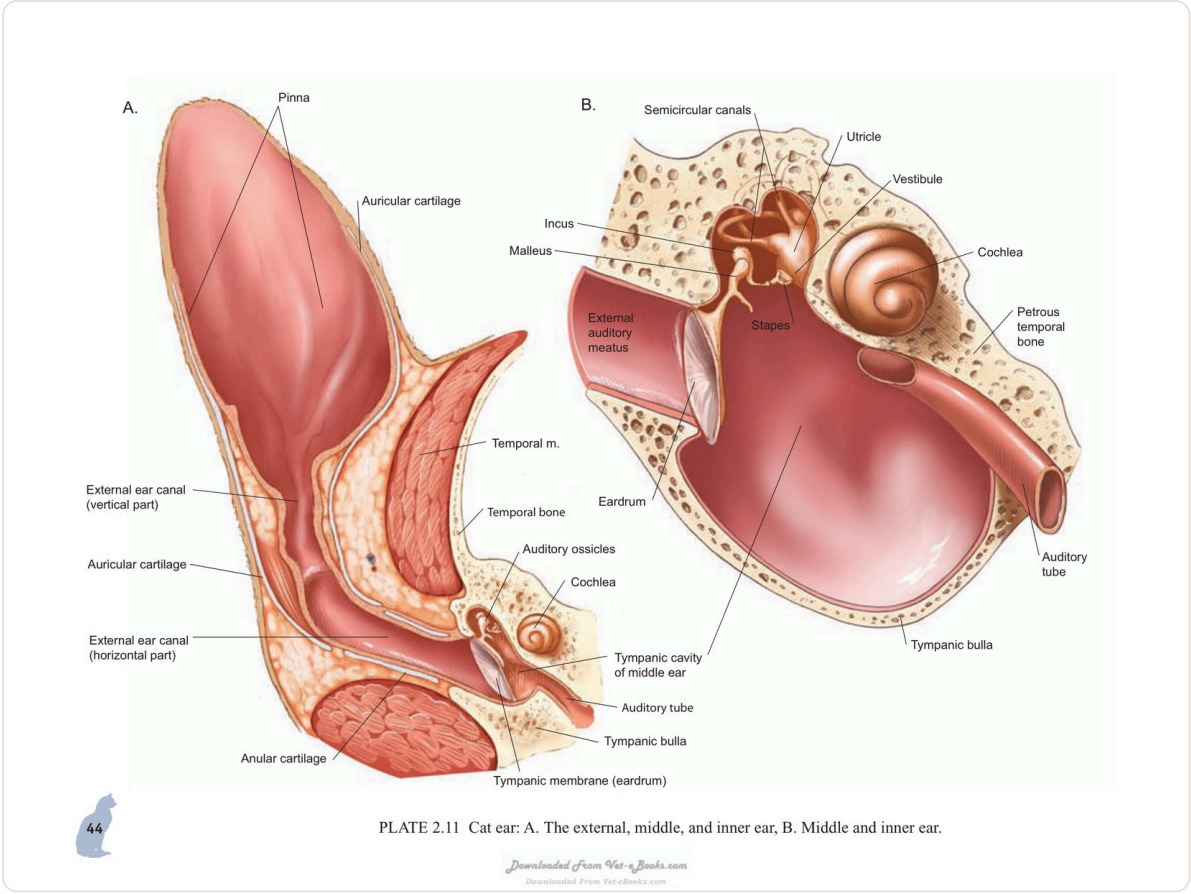

Fig 9 — The external, middle and inner ear.

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The pinna and ear canal, the tympanic membrane and ossicles, and the cochlea and vestibular apparatus of the inner ear.

Behind the retina sits the **tapetum lucidum**, a reflective layer that bounces light back through the photoreceptors — the source of eyeshine and of vision in roughly one-sixth the light a human needs. A vertical slit pupil ranges from a pinhole in daylight to fully open at night, and a third eyelid (nictitating membrane) protects the cornea.

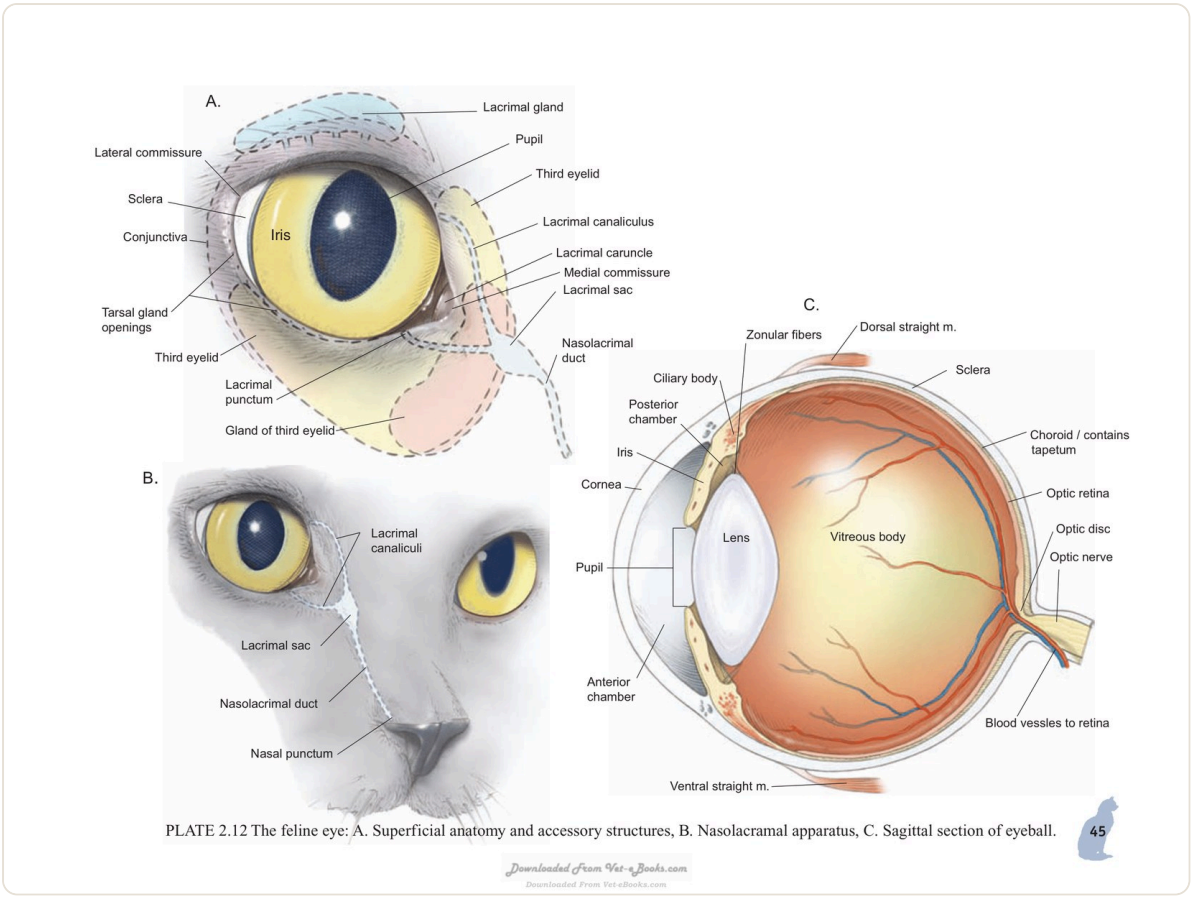

Fig 10 — The eye and adnexal ocular structures.

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Cornea, iris and slit pupil, lens, retina and the reflective tapetum lucidum, with the eyelids and third eyelid.

07 The digestive system

Feline digestive anatomy is the signature of a strict meat-eater: **short and simple**. A single-chamber stomach empties into a short small intestine (only about 4:1 to body length, versus ~6:1 in the dog), a tiny caecum (cecum) and a short colon. This efficient, meat-tuned gut digests protein fast but copes badly with fasting — the anatomical root of hepatic lipidosis in the anorexic cat.

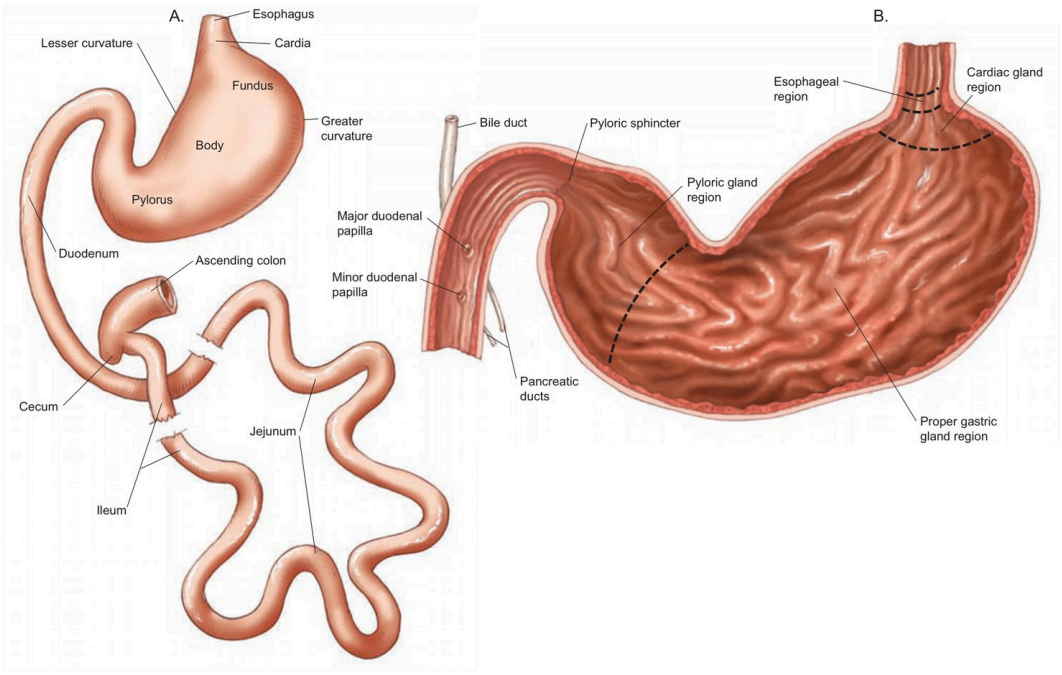

Fig 11 — Isolated stomach and intestines.

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The simple stomach (cardia, fundus, body, pylorus) and the short small intestine — duodenum, jejunum and ileum — of a carnivore.

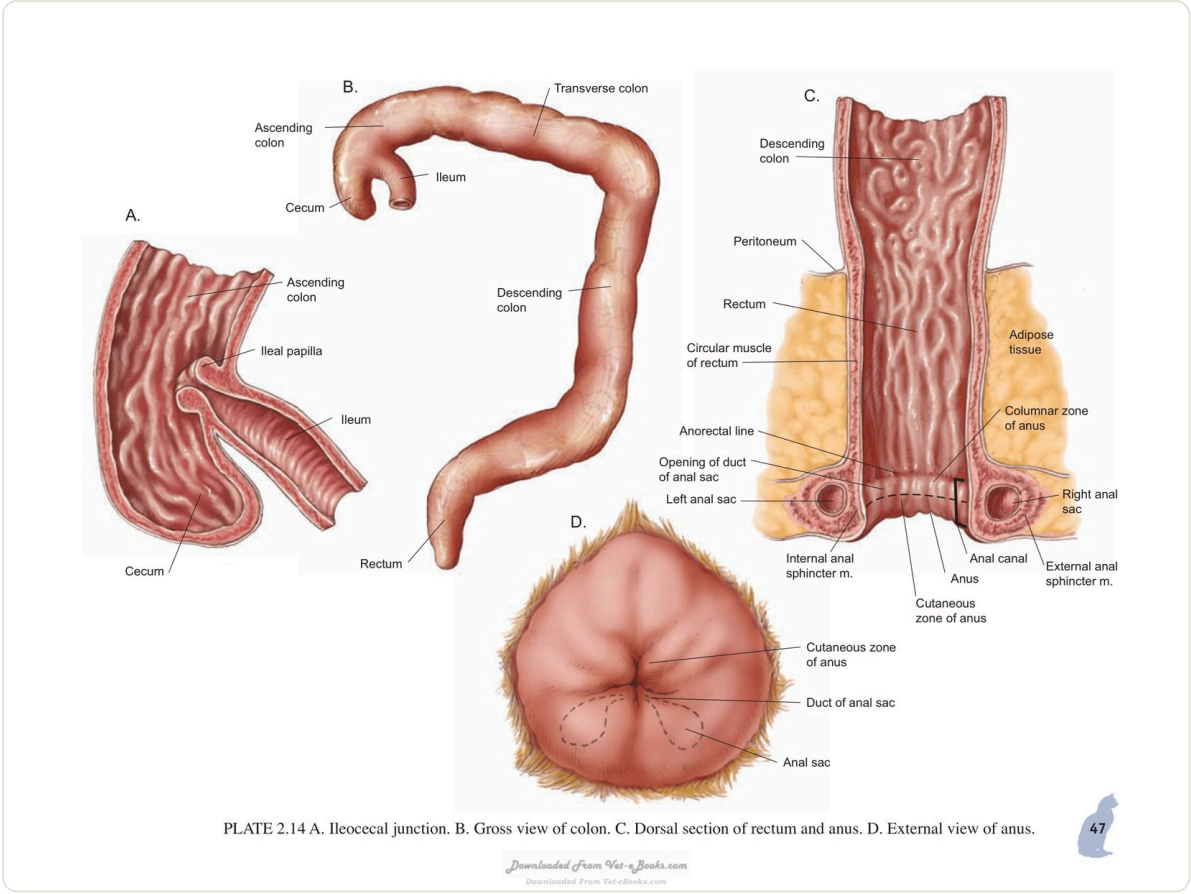

PLATE 2.14 A. Ileocecal junction. B. Gross view of colon. C. Dorsal section of rectum and anus. D. External view of anus.

Fig 12 — Large intestine, anus and anal sacs.

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The short colon and rectum, and the paired anal sacs whose ducts open at the anus — a common site of clinical problems.

08 Inside the body cavities

Seeing the organs in place — related to the skeleton — is how you build a mental map for palpation, imaging and surgery. The thorax holds the heart and lungs behind the ribcage and diaphragm; the abdomen holds the liver, stomach, spleen, intestines, kidneys and bladder.

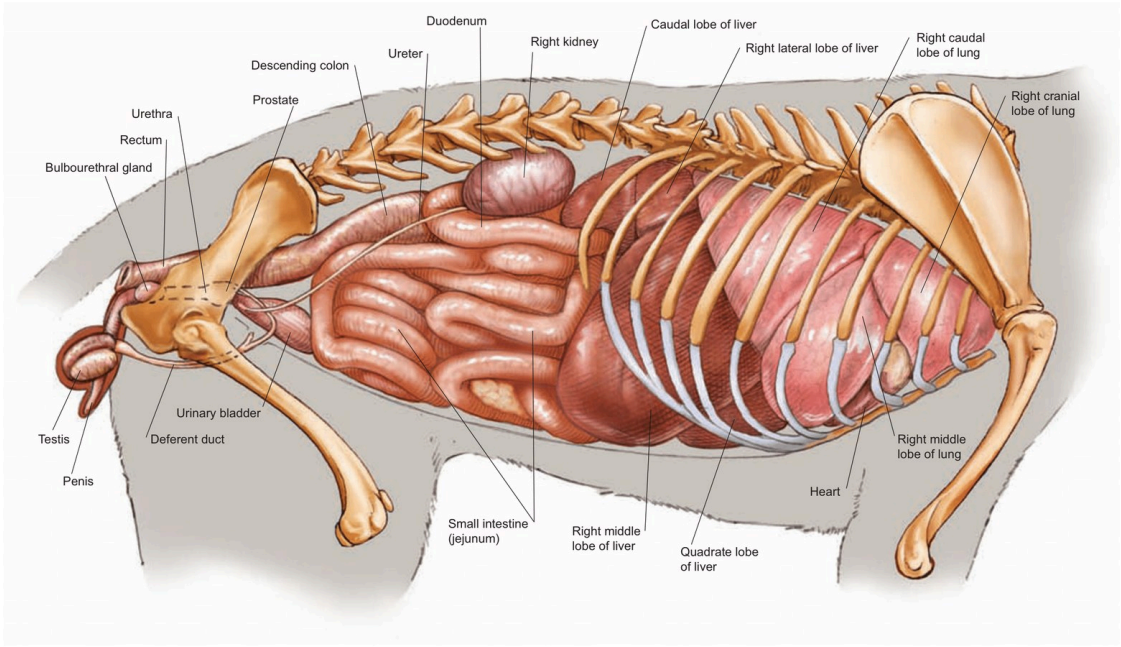

Fig 13 — Thoracic, abdominal and pelvic viscera in situ.

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The organs in their natural positions against the skeleton: heart and lungs in the thorax; liver, stomach, spleen, intestines and kidneys in the abdomen.

09 The respiratory and urinary systems

Two systems that the cat's size and habits make disproportionately important clinically.

The **respiratory system** runs from the nares through the nasal chambers and nasopharynx, past the larynx, down the **trachea** — a ringed tube that in the cat is narrow enough that a small amount of swelling or a modest endotracheal tube trauma matters a great deal — and divides into the **bronchi** and then progressively smaller bronchioles to the alveoli. The lungs sit in two pleural cavities either side of the mediastinum, and the **diaphragm** does most of the work of breathing. The feline lower airway is unusually reactive: bronchoconstriction and mucus in the small airways is why feline asthma exists as a clinical entity and why cats so often present with an expiratory push and a crouched posture rather than an obvious cough.

The **urinary system** is a pair of bean-shaped **kidneys** — in the cat unusually mobile and easy to palpate, which is why they are a routine part of the physical examination — each draining through a **ureter** to the bladder, and out through the **urethra**. The anatomy has one consequence worth knowing above all others: in the male cat the urethra narrows markedly as it passes through the penis, and that narrowing is why **urethral obstruction** is an emergency of male cats and essentially not of females. A blocked tom is an anatomical problem before it is anything else.

The **pancreas** sits in the cranial abdomen against the duodenum and stomach, doing two jobs at once — digestive enzymes from the exocrine tissue, insulin and glucagon from the islets. In the cat the pancreatic and bile ducts usually join *before* entering the duodenum, unlike the dog, which is the anatomical reason inflammation of one so readily involves the other: the classic feline triad of pancreatitis, cholangitis and inflammatory bowel disease.

10 The reproductive system

The cat is an **induced (reflex) ovulator**: unlike the dog, the queen does not ovulate spontaneously each cycle — mating itself triggers the LH surge that releases the eggs. The stimulus is anatomical: the tom's penis carries backward-pointing keratinised spines (testosterone-dependent, lost after castration) that stimulate the vagina on withdrawal. The queen's uterus is bicornuate, with long horns built to carry a litter.

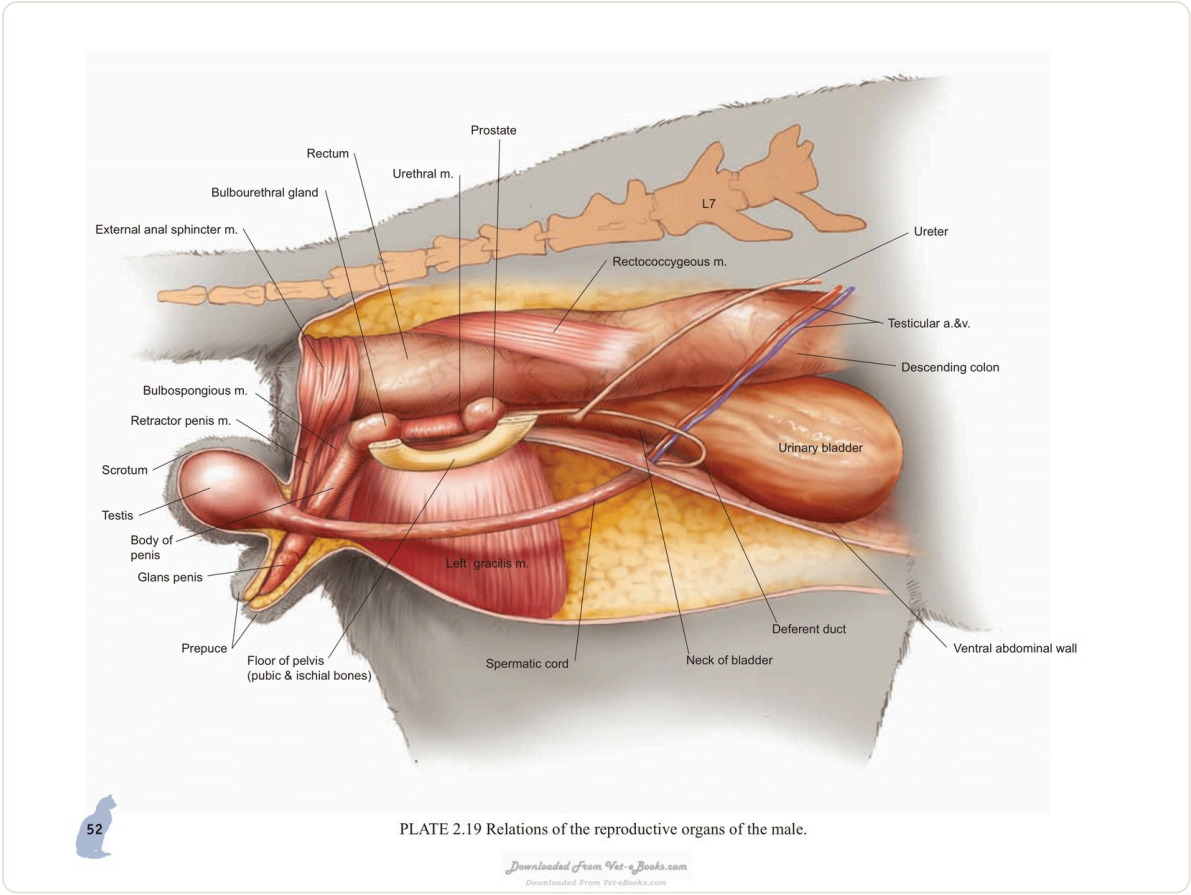

Fig 14 — Reproductive organs of the male cat.

Testes and epididymis, ductus deferens, prostate and the spined penis whose withdrawal triggers reflex ovulation in the queen.

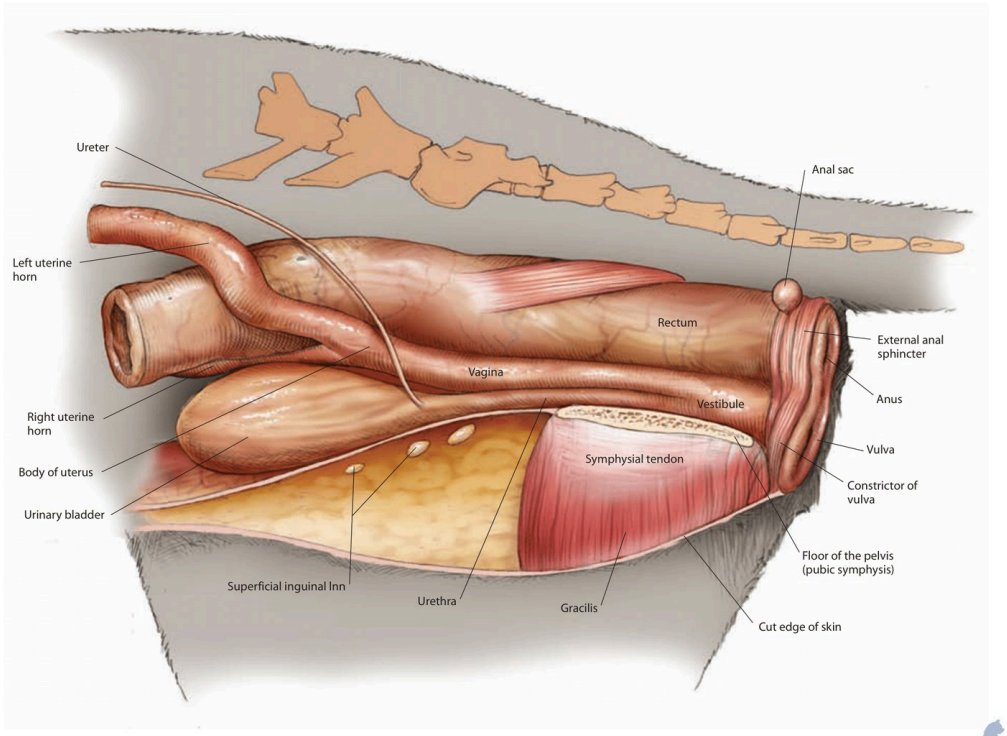

Fig 15 — Reproductive organs of the female cat.

Ovaries, uterine tubes and the bicornuate uterus with its long horns, cervix and vagina.

11 The cardiovascular system

The feline heart is a compact four-chamber double pump, beating about 140–180 times a minute at rest. Its clinical fingerprint is **hypertrophic cardiomyopathy (HCM)**, in which the left ventricular wall thickens — often silently — and can throw a clot to the **aortic trifurcation** ('saddle thrombus'), the point where the aorta divides to the hind limbs.

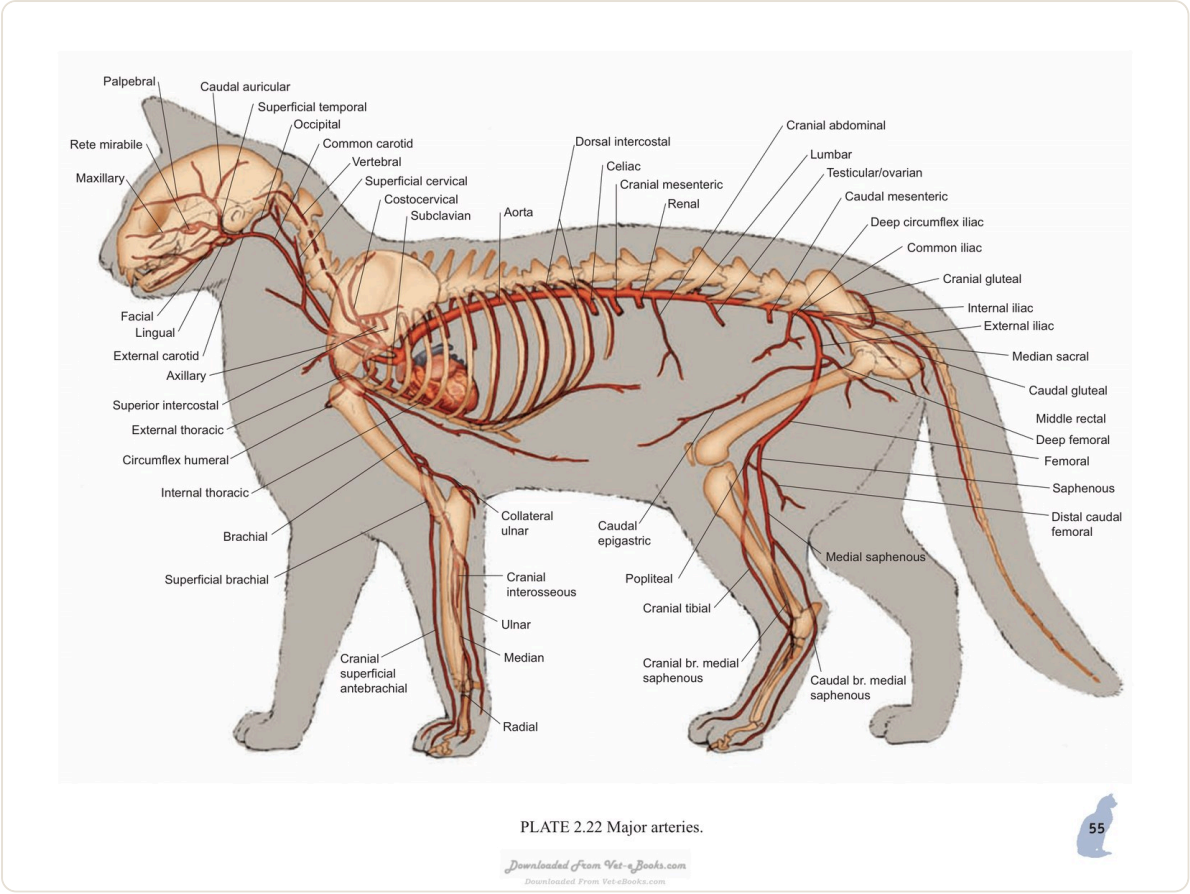

Fig 16 — Major arteries of the cat.

The heart and aorta with its branches to head, limbs and viscera; note the aortic trifurcation to the hind limbs — the lodging site of feline aortic thromboembolism.

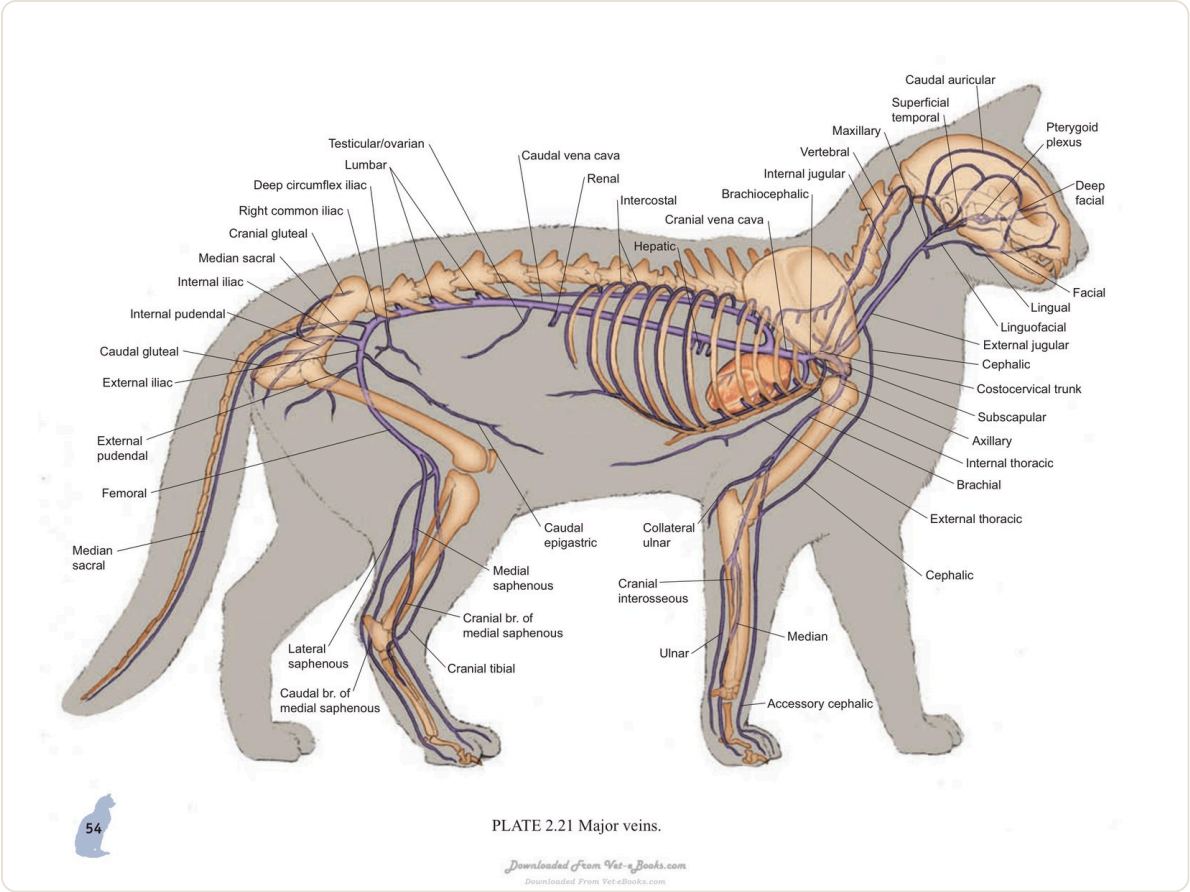

Fig 17 — Major veins of the cat.

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The cranial and caudal venae cavae and the portal system returning blood to the heart and liver.

12 Endocrine & lymphatic systems

The endocrine glands regulate feline metabolism, and two patterns dominate the clinic: the **thyroid** (hyperthyroidism is common in older cats) and the pancreatic islets (diabetes mellitus, tied to obesity). Alongside them, the lymphoid organs — spleen, thymus and the peripheral node chains you palpate on exam — are central to feline lymphoma and the retroviruses FeLV and FIV.

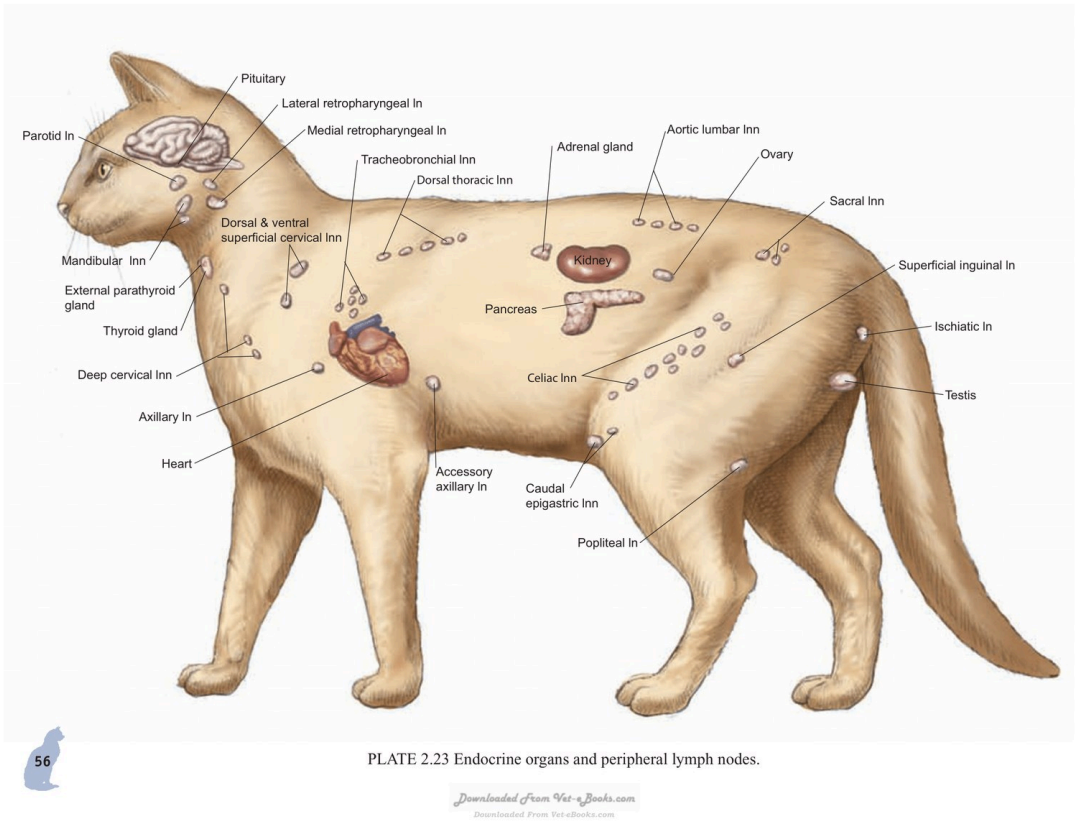

Fig 18 — Endocrine organs and lymph nodes.

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The thyroid, adrenals and pancreatic islets, with the spleen and the peripheral lymph-node chains used in the physical exam.

13 The nervous system

The feline brain and spinal cord follow the mammalian pattern, but with the large olfactory bulbs and well-developed visual and auditory centres of a hunter. The spinal cord gives off the brachial and lumbosacral plexuses that supply the limbs, and the autonomic nervous system balances fight-or-flight against rest-and-digest control of the heart, gut, pupil and bladder.

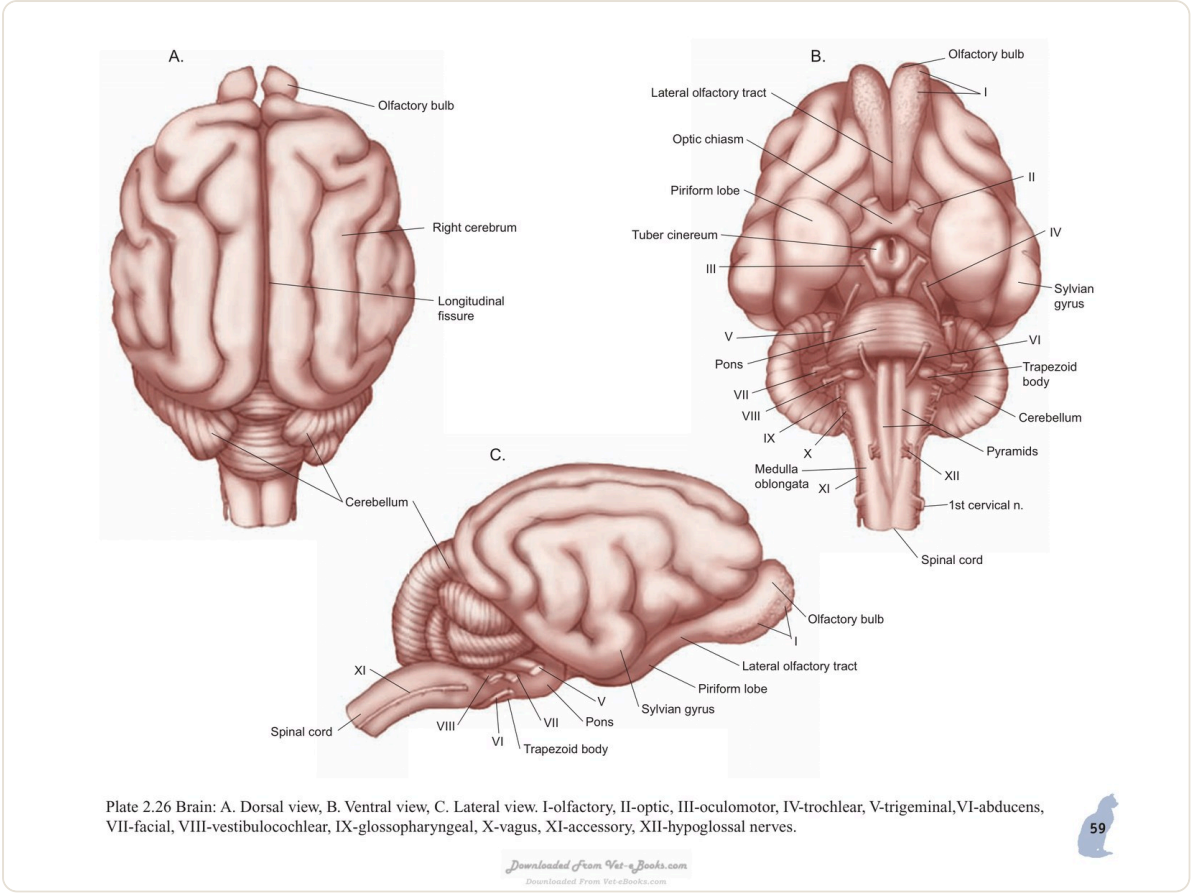

Plate 2.26 Brain: A. Dorsal view, B. Ventral view, C. Lateral view. I-olfactory, II-optic, III-oculomotor, IV-trochlear, V-trigeminal,VI-abducens, VII-facial, VIII-vestibulocochlear, IX-glossopharyngeal, X-vagus, XI-accessory, XII-hypoglossal nerves.

Fig 19 — The brain.

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Cerebral hemispheres, cerebellum and brainstem, the olfactory bulbs, and the roots of the twelve cranial nerves — the basis of the cranial-nerve exam.

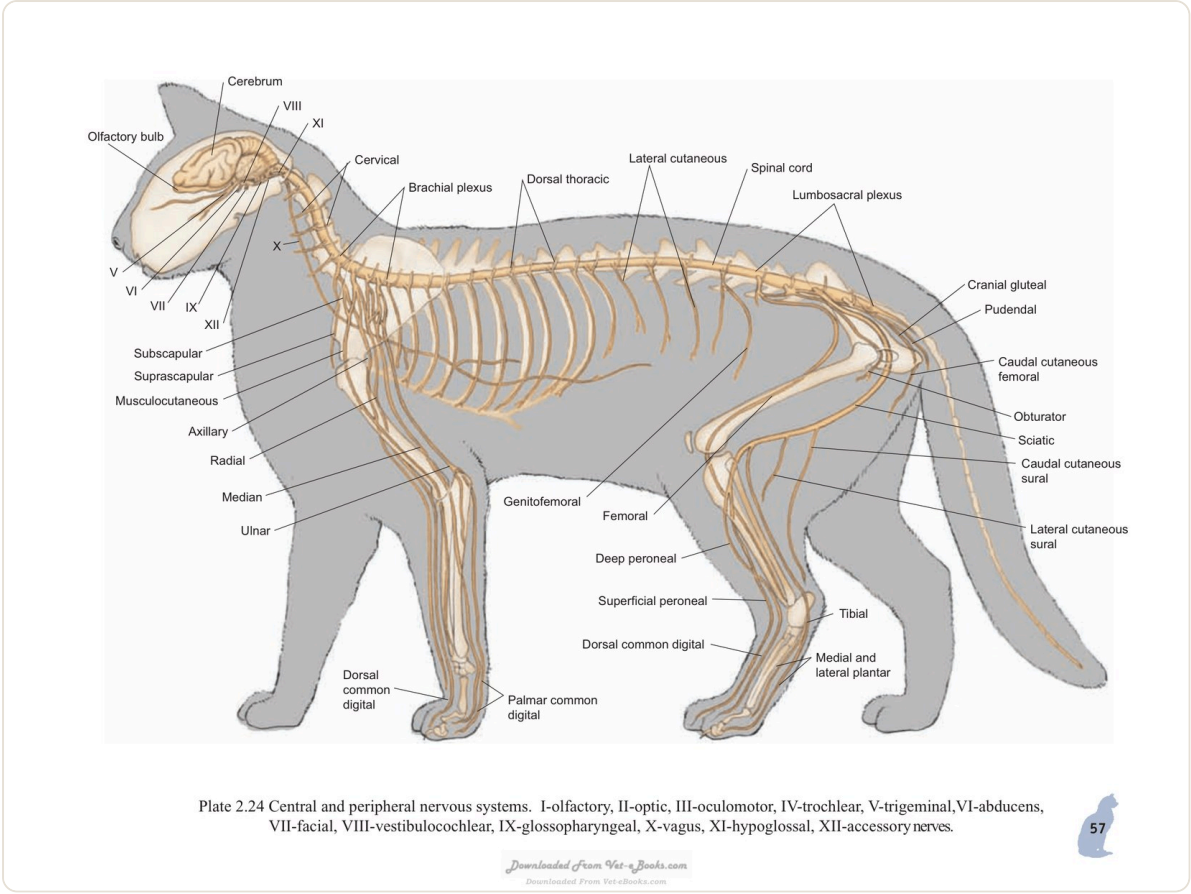

Plate 2.24 Central and peripheral nervous systems. I-olfactory, II-optic, III-oculomotor, IV-trochlear, V-trigeminal, VI-abducens, VII-facial, VIII-vestibulocochlear, IX-glossopharyngeal, X-vagus, XI-hypoglossal, XII-accessory nerves.

Fig 20 — Central nervous system and spinal nerves.

The brain and spinal cord with the segmental spinal nerves and the brachial and lumbosacral plexuses that supply the limbs.

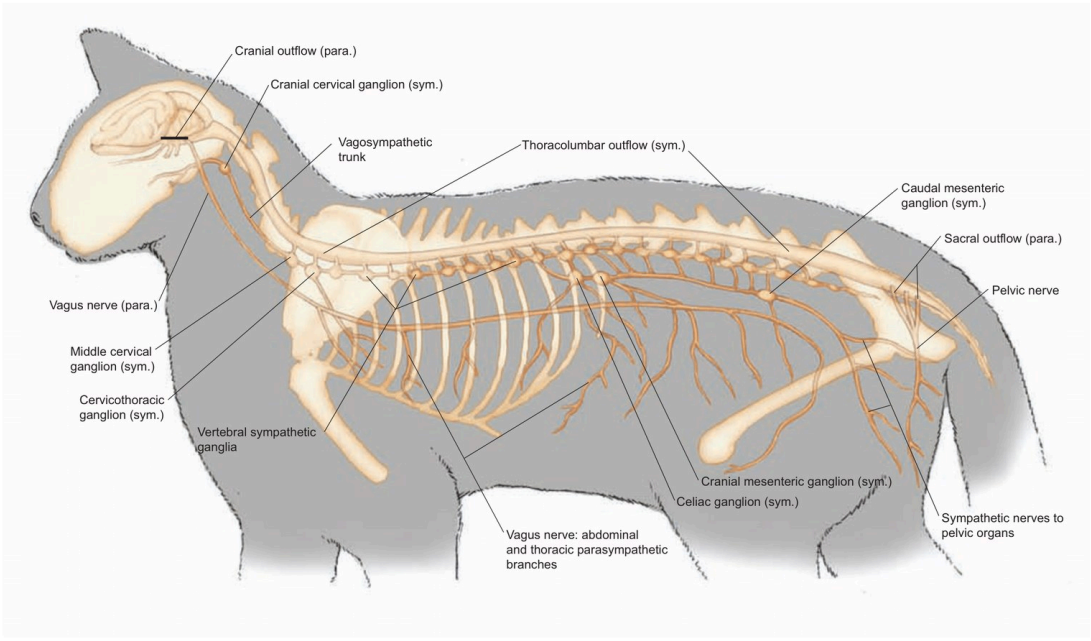

Fig 21 — The autonomic nervous system.

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Sympathetic and parasympathetic outflow to the heart, gut, pupil and bladder — the wiring behind signs such as Horner's syndrome.

14 Cat anatomy — frequently asked questions

How many bones does a cat have?

About 230–240, depending mainly on tail length — more than the 206 in an adult human, largely because of the long tail.

Why can cats squeeze through such small gaps?

Their collarbone (clavicle) is vestigial and not joined to the skeleton, so the shoulders can collapse inward. If a cat's head and whiskers fit, the rest usually follows.

How do a cat’s retractable claws work?

At rest an elastic ligament holds each claw sheathed. Contracting the deep digital flexor rotates the last toe bone down and swings the claw out, so the claws are protracted on demand rather than always exposed.

Why can cats see in the dark?

A reflective tapetum lucidum behind the retina bounces light back through the photoreceptors, giving eyeshine and vision in roughly one-sixth the light a human needs.

What are a cat’s whiskers actually for?

The whiskers, properly **vibrissae**, are not hairs in the ordinary sense: each sits in a deep, richly innervated blood-filled sinus and works as a mechanoreceptor. They map the width of a gap, detect air movement around obstacles in the dark, and the short vibrissae above the eyes trigger a protective blink. The long mystacial vibrissae are approximately as wide as the cat's chest, which is what lets a cat judge whether it will fit through a space before committing to it.

Why do cats need taurine in their diet?

Because the cat is an **obligate carnivore** and has lost the enzymatic capacity to make enough **taurine** from other amino acids, while continuing to lose it in bile salts. The consequences are anatomical as well as biochemical: chronic taurine deficiency causes **dilated cardiomyopathy** and **central retinal degeneration**. It is the clearest example of a principle that runs through the whole of feline anatomy — the cat is not a small dog, and its structure reflects a diet of whole prey.

Is cat anatomy the same as dog anatomy?

The plan is similar but the clinically important differences are large: obligate-carnivore gut and metabolism, induced ovulation, a highly concentrating kidney, and predispositions to HCM and hyperthyroidism. Treating a cat as a small dog is a classic mistake.

> **When to refer**
>
> - **The cat that stopped eating** — even 1–2 days of anorexia risks hepatic lipidosis; feed early, never fast.
> - **The straining tom** — a blocked urethra is an emergency driven by the long, narrow male urinary anatomy.
> - **Open-mouth breathing** — abnormal in a cat; think respiratory disease or HCM, and handle minimally.
> - **Never dose like a dog** — feline hepatic metabolism makes drugs such as paracetamol highly toxic.

Sources

1. McCracken TO, Kainer RA. *Color Atlas of Small Animal Anatomy: The Essentials*. Wiley-Blackwell — Section 2 (The Cat), Plates 2.3–2.26. Source of the labelled anatomical illustrations, reproduced for educational reference.
2. Little SE (ed). The Cat: Clinical Medicine and Management. 2nd ed. St Louis: Elsevier Saunders; 2012 — feline clinical anatomy and normal values.
3. Hudson LC, Hamilton WP. Atlas of Feline Anatomy for Veterinarians. 2nd ed. Jackson: Teton NewMedia; 2010 — cross-reference for systemic feline anatomy.

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