

ANAT20006

Principles of Structure and Function of the Human Body

LECTURE NOTES - WEEK 1

Lecture 1: Anatomical Terminology • Lecture 2: Nervous System I • Lecture 3: Peripheral Nervous System

HOW TO USE THESE NOTES

- Bold navy terms are exam-relevant keywords - know their definitions.
- Blue Key Term boxes give clean, quotable definitions for quick revision.
- Gold Concept boxes highlight the why, the logic that ties ideas together.
- Red Clinical Relevance boxes connect content to real-world/clinical scenarios - great for SAQs.

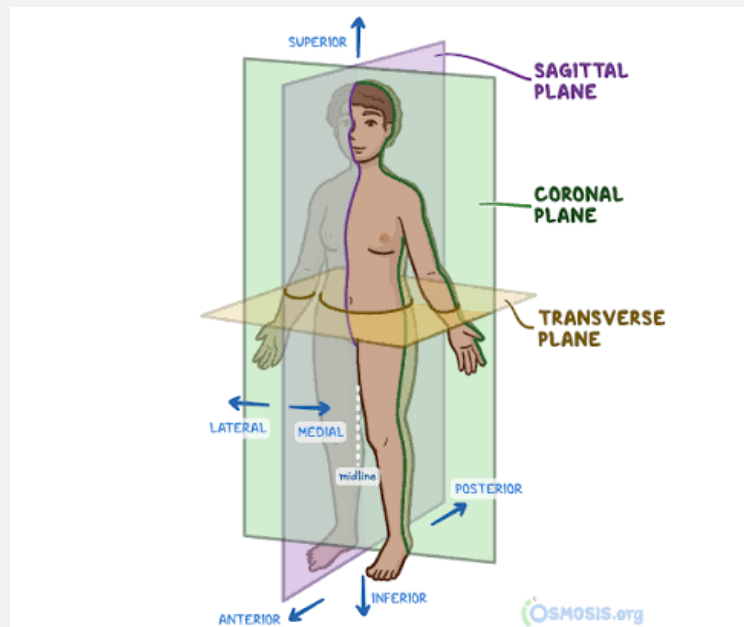
LECTURE 1

Anatomical Terminology

Anatomy has its own language. Almost every directional or positional term exists as part of an opposite pair - learning them together, as relationships rather than isolated words, makes them far easier to recall under exam pressure.

1.1 The Anatomical Position

All anatomical terminology is described relative to a single reference posture: the anatomical position. Standing upright, facing forward, arms by the sides, palms facing forward. Every directional term in this course assumes the body is in this position, regardless of how the body is actually oriented in real life.



1.2 Directional Terms - Paired Opposites

These terms work in opposite pairs. Learn each pair together rather than as separate vocabulary.

Term	Opposite	Meaning
Anterior	Posterior	Towards the front / towards the back of the body
Superior	Inferior	Towards the head / towards the feet

Term	Opposite	Meaning
Proximal	Distal	Closer to / further from the point of attachment (used for limbs)
Medial	Lateral	Towards the midline / away from the midline
Superficial	Deep	Closer to the body surface / further from the surface, towards the internal structures

KEY TERM

Median - The single, exact mid-line of the body - there is only ever one median line. Medial describes movement toward this line, and lateral describes movement away from it.

THINK IN RELATIONSHIPS, NOT LISTS

- Anterior view = facing towards the observer; lateral view = viewed from the side.
- Layers of the body run from superficial (skin) to deep (internal structures).
- Superficial structures (e.g. superficial muscles) tend to be longer than the deep structures beneath them.

1.3 Anatomical Planes

The body can be sliced along three reference planes, each producing a different pair of sections.

Plane	Orientation	Produces
Transverse (horizontal)	Cuts straight across the body	Superior and inferior portions
Sagittal	Cuts front-to-back, along the midline	Left and right portions
Coronal (frontal)	Cuts vertically, side to side	Anterior and posterior portions

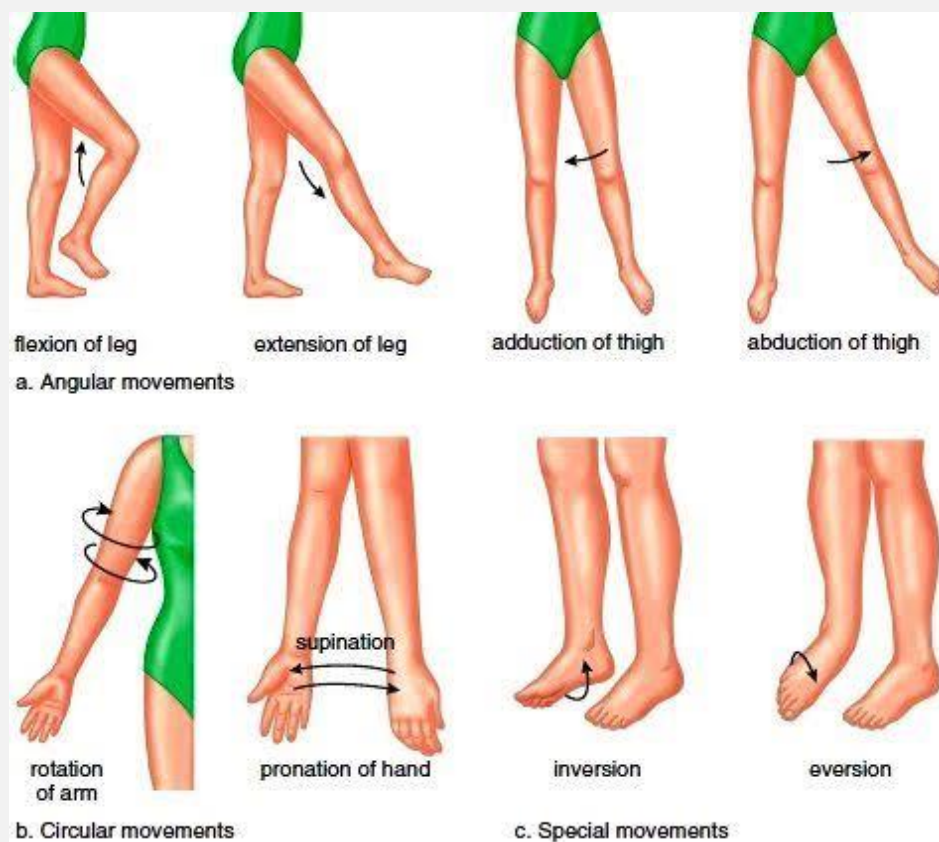
1.4 Movement Terminology

Term	Opposite	Meaning
Flexion	Extension	Bending a joint, decreasing the joint angle / straightening a joint, increasing the joint angle
Abduction	Adduction	Moving a limb away from the torso / moving a limb back towards the torso

Term	Opposite	Meaning
Internal (medial) rotation	External (lateral) rotation	Rotating a limb towards the midline (chest) / rotating a limb away from the midline

WORKED EXAMPLE: THE FOETAL POSITION

The foetal position is the clearest example of pure flexion - every major joint (hips, knees, spine, neck) is flexed simultaneously, curling the body inward. Picturing this position is a quick way to remember what flexion looks like across the whole body, not just at one joint.



1.5 Quick Reference: Useful Word Roots

KEY TERM

Brachi- - Prefix referring to the forelimb (e.g. brachial = relating to the arm).

LECTURE 2

The Nervous System I

2.1 Overview: CNS vs. PNS

The nervous system is organised into two major components:

Division	Components
Central Nervous System (CNS)	Brain and spinal cord
Peripheral Nervous System (PNS)	Nerves and ganglia connecting the CNS to muscles and skin

2.2 Directional Terms in the Nervous System

The nervous system introduces a few additional directional terms alongside the ones from Lecture 1.

Term	Meaning
Dorsal	Towards the back - broadly equivalent to posterior/superior in the head
Ventral	Towards the front - broadly equivalent to anterior
Rostral	Towards the nose / higher up within the nervous system
Caudal	Towards the tail / lower down within the nervous system

PLANES IN THE BRAIN

- Front-to-back through the brain = sagittal plane.
- A slice across the brain (through the crown) = coronal plane.

2.3 Cells of the Nervous System

Neurons are the functional units providing electrical conduction. They are supported by glial cells - glia literally translates to glue.

Glial Cell Types

Astrocytes - Support neurons and synaptic transmission; form the crucial blood-brain barrier (BBB), making the CNS an immune-privileged space that substances in the blood cannot readily enter.

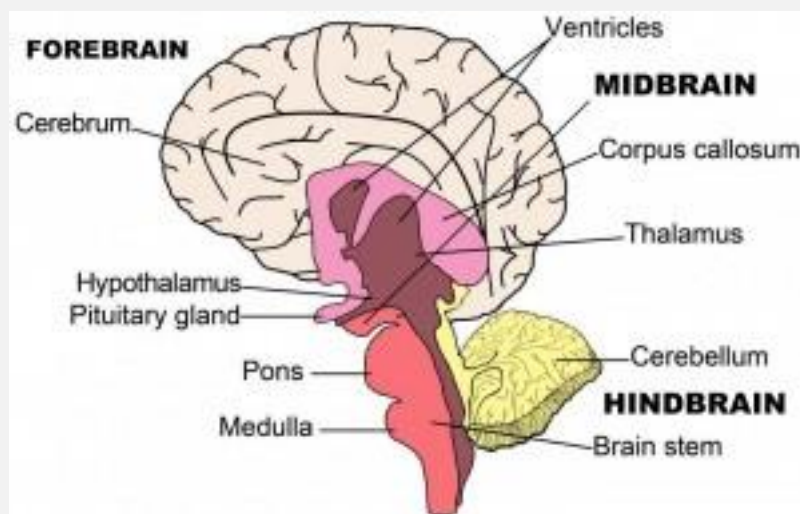
Oligodendrocytes - Encase neuronal axons, producing the fatty myelin sheath (this is why white matter appears white).

Microglia - The CNS's dedicated immune cells - most circulating immune cells cannot cross the BBB, so the brain maintains its own separate immune defence via microglia.

2.4 Major Brain Regions

Moving caudally from the cerebral hemispheres:

- **Diencephalon** - contains the thalamus and hypothalamus, which govern autonomic processes.
- **Brainstem** - formed of the midbrain, pons, and medulla oblongata. The pons acts as a bridge between the medulla/midbrain and the cerebellum.
- **Cerebellum** - critical for motor control and movement, made up of four major components.

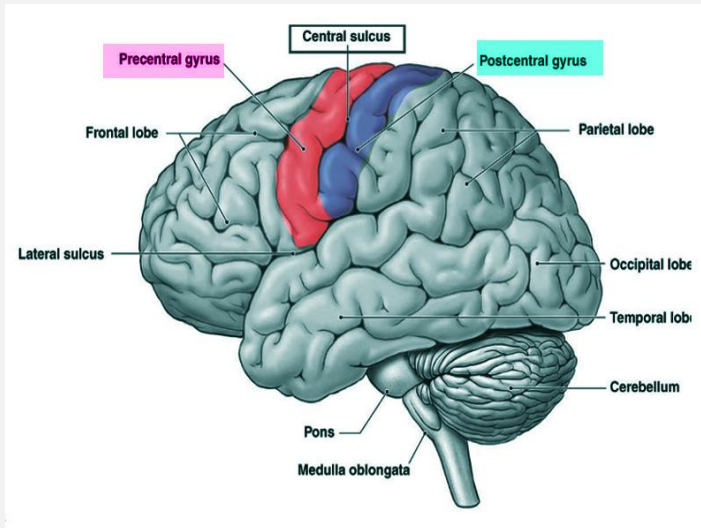


2.5 Surface Anatomy of the Cerebrum

The human cerebrum is folded (undulated) to increase surface area - and therefore cell number - within the fixed volume of the cranium.

Structure	Definition
Gyrus (pl. gyri)	A fold/ridge on the cerebral surface
Sulcus (pl. sulci)	A groove between folds
Folia	The cerebellar equivalent of gyri (folds of the cerebellum)
Central sulcus	Landmark groove separating the frontal and parietal lobes
Precentral gyrus	Site of the primary motor cortex

Structure	Definition
Postcentral gyrus	Site of the primary sensory cortex
Longitudinal fissure	Deep sagittal-plane groove separating the left and right cerebral hemispheres



2.6 Lobes of the Brain

The cerebrum is divided into the frontal, parietal, occipital, and temporal lobes. A fifth lobe - the insula (island lobe) - sits buried and isolated deep within the lateral surface. The corpus callosum is the large bundle of neurons connecting the left and right hemispheres, enabling interhemispheric communication.

2.7 The Meninges

The brain is delicate and requires protection. The CNS is wrapped in three connective tissue membranes, collectively called the meninges, running from outermost to innermost:

Layer (outer → inner)	Description
Dura mater	Tough mother - a tough, fibrous outer layer. Forms folds including the falx cerebri (between the two cerebral hemispheres) and the tentorium cerebelli (separating cerebrum from cerebellum), which hold each part of the brain in position - like tucked-in bedsheets.
Subdural space	Small potential space beneath the dura mater
Arachnoid mater	Named for its spider-web-like appearance
Subarachnoid space	Contains the cerebrospinal fluid (CSF)

Layer (outer → inner)	Description
Pia mater	Delicate mother - the innermost, thin layer that closely follows the brain surface

Full outer-to-inner order: skin → skull bone → dura mater → subdural space → arachnoid mater → subarachnoid space (CSF) → pia mater → neural tissue.