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Rehabilitation for stoke

i-CARE

Increasing the Conformance of Academia towards Rehabilitation Engineering (i-CARE)

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Prepared by: Haasan Khalaf

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الكلية الجامعية للعلوم التطبيقية
University College of Applied Sciences

DCU

Univerzitetni rehabilitacijski inštitut
Republike Slovenije - Soča

BATTI
Ideas transforming the future

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Functions of the Nervous System

- **Sensory function.** Sensory receptors *detect* internal stimuli, such as an increase in blood pressure, or external stimuli. **This sensory information is then carried into the brain and spinal cord through cranial and spinal nerves**.
- **Integrative function.** The nervous system *processes* sensory information by analyzing it and making decisions for appropriate responses—an activity known as **integration.**
- **Motor function.** Once sensory information is integrated, the nervous system *may elicit an appropriate motor response* by activating **effectors** (muscles and glands) through cranial and spinal nerves.

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Refractory Period

Large-diameter axons have a larger surface area and have a brief absolute refractory period of about 0.4 msec.

Because a second nerve impulse can arise very quickly, up to 1000 impulses per second are possible.

Small-diameter axons have absolute refractory periods as long as 4 msec, enabling them to transmit a maximum of 250 impulses per second.

Under normal body conditions, the maximum frequency of nerve impulses in different axons ranges between 10 and 1000 per second.

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Divisions of the Nervous System

The nervous system as a whole consists of two principal divisions called

The central nervous system and

The peripheral nervous system .

Because the brain and the spinal cord occupy a midline or central location in the body, they are together called the central nervous system or CNS.

Similarly, the usual designation for the nerves of the body is the peripheral nervous system or PNS.

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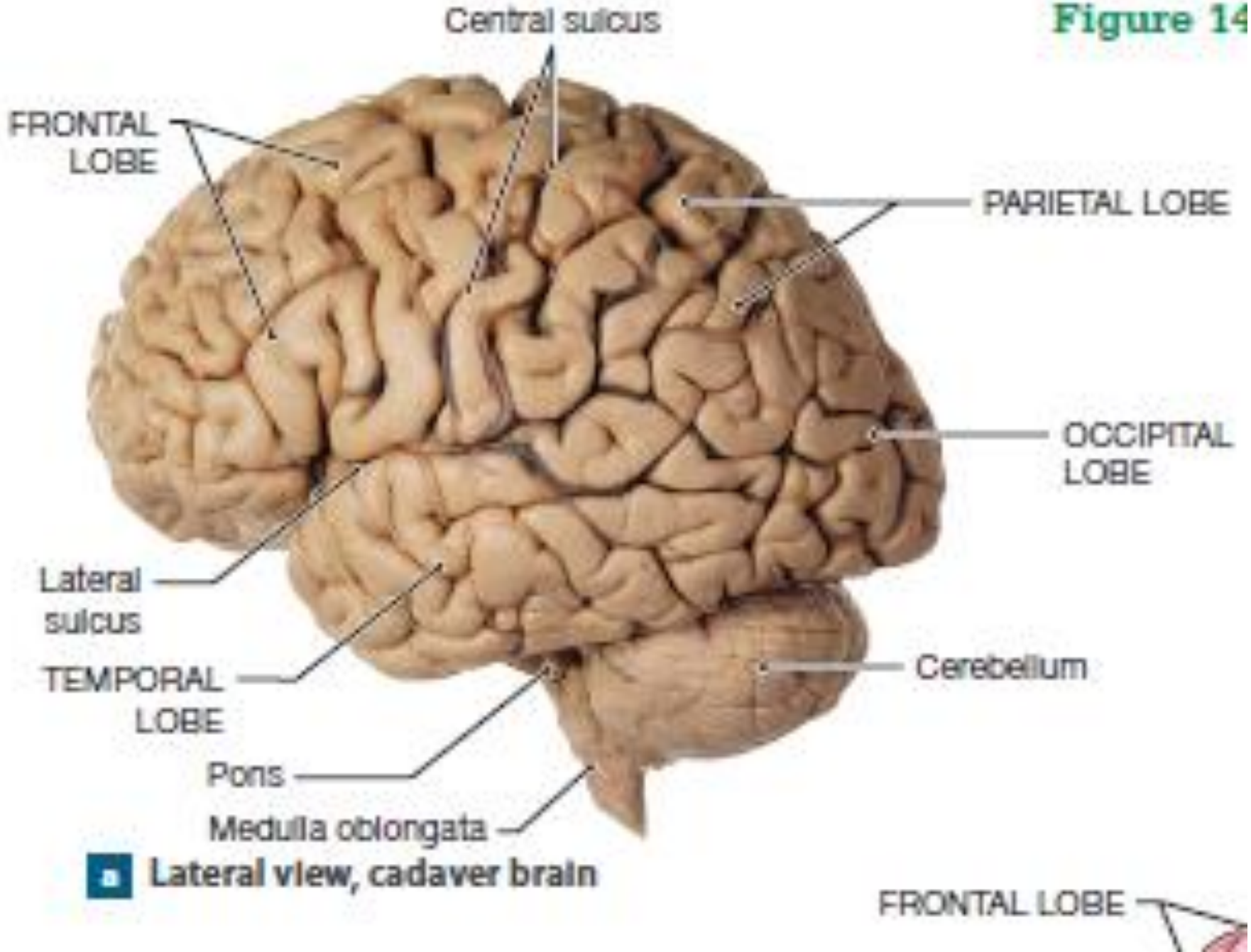

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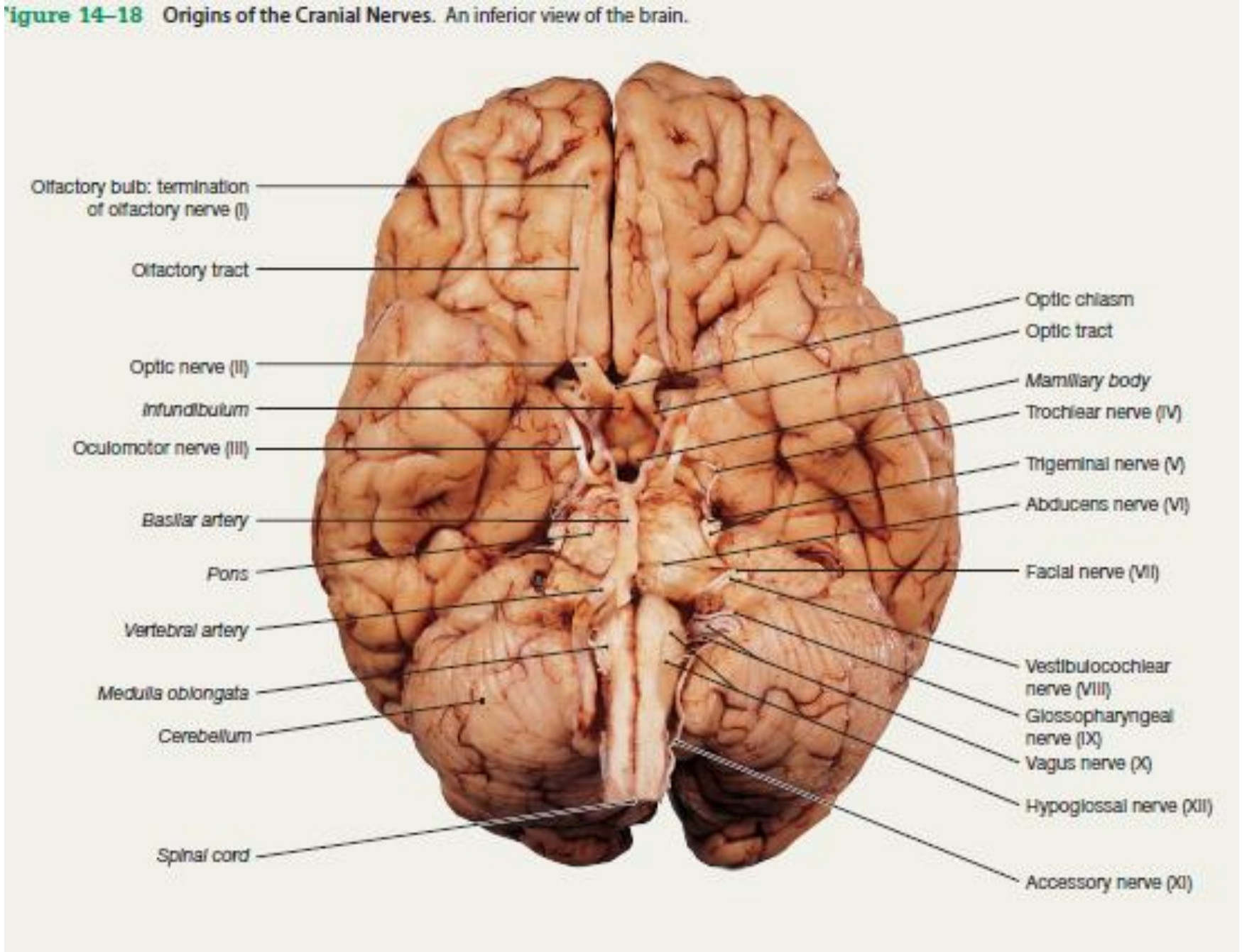
Figure 14–18 Origins of the Cranial Nerves. An inferior view of the brain.



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Divisions of the Brain

The brain, one of our largest organs, consists of the following major divisions, named in ascending order beginning with most inferior part:

I. Brain stem

A. Medulla oblongata

B. Pons

C. Midbrain

II. Cerebellum

III. Diencephalon

A. Hypothalamus

B. Thalamus

IV. Cerebrum

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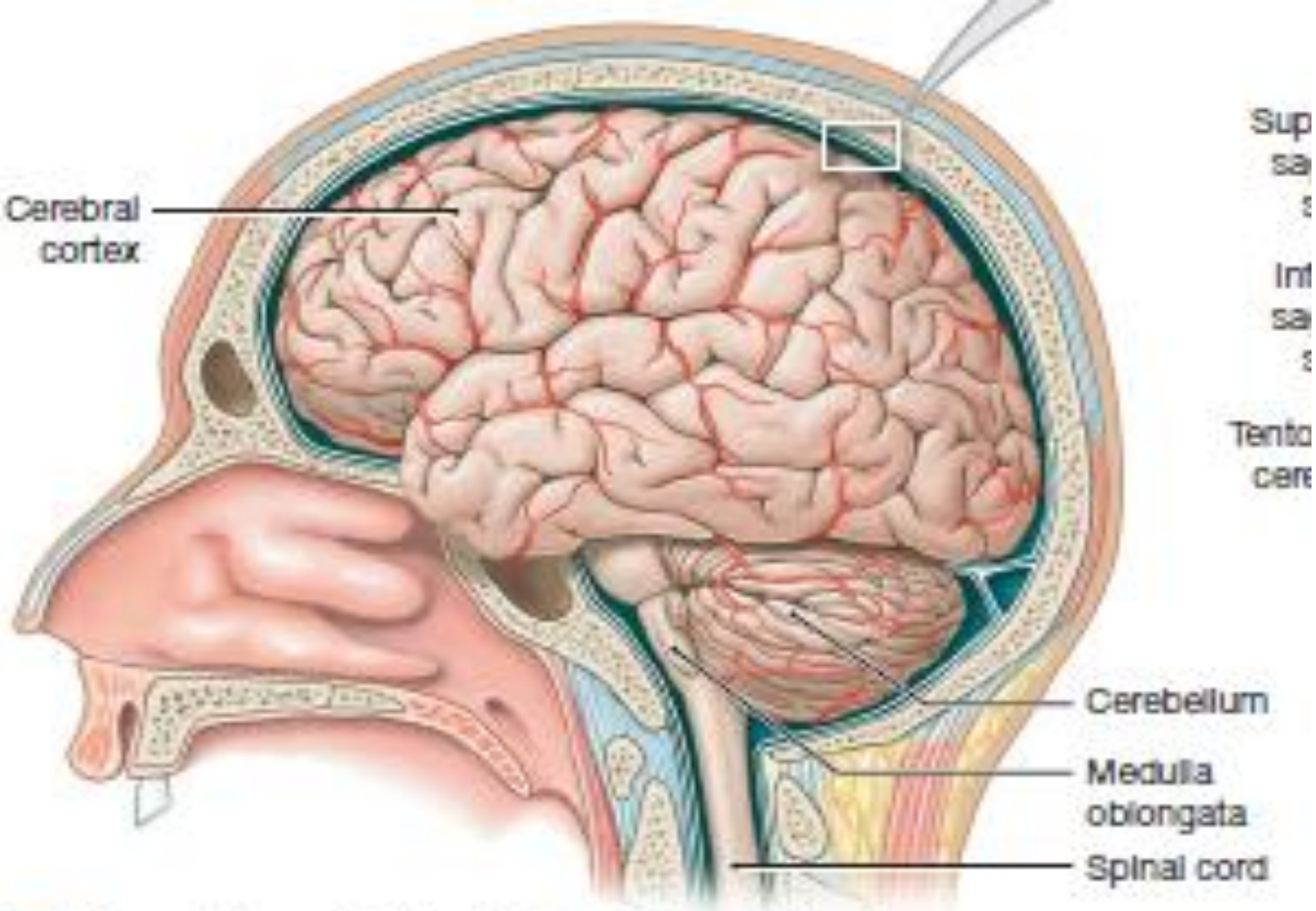

A lateral view of the brain, showing its position in the cranium and the organization of the meninges

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Specific types of sensory, motor, and integrative signals are processed in certain regions of the cerebral cortex

Generally**, sensory areas** receive sensory information and are involved in perception, the conscious awareness of a sensation;

motor areas control the execution of voluntary movements; and

association areas deal with more complex integrative functions such as **memory, emotions, reasoning, will, judgment, personality traits, and intelligence**

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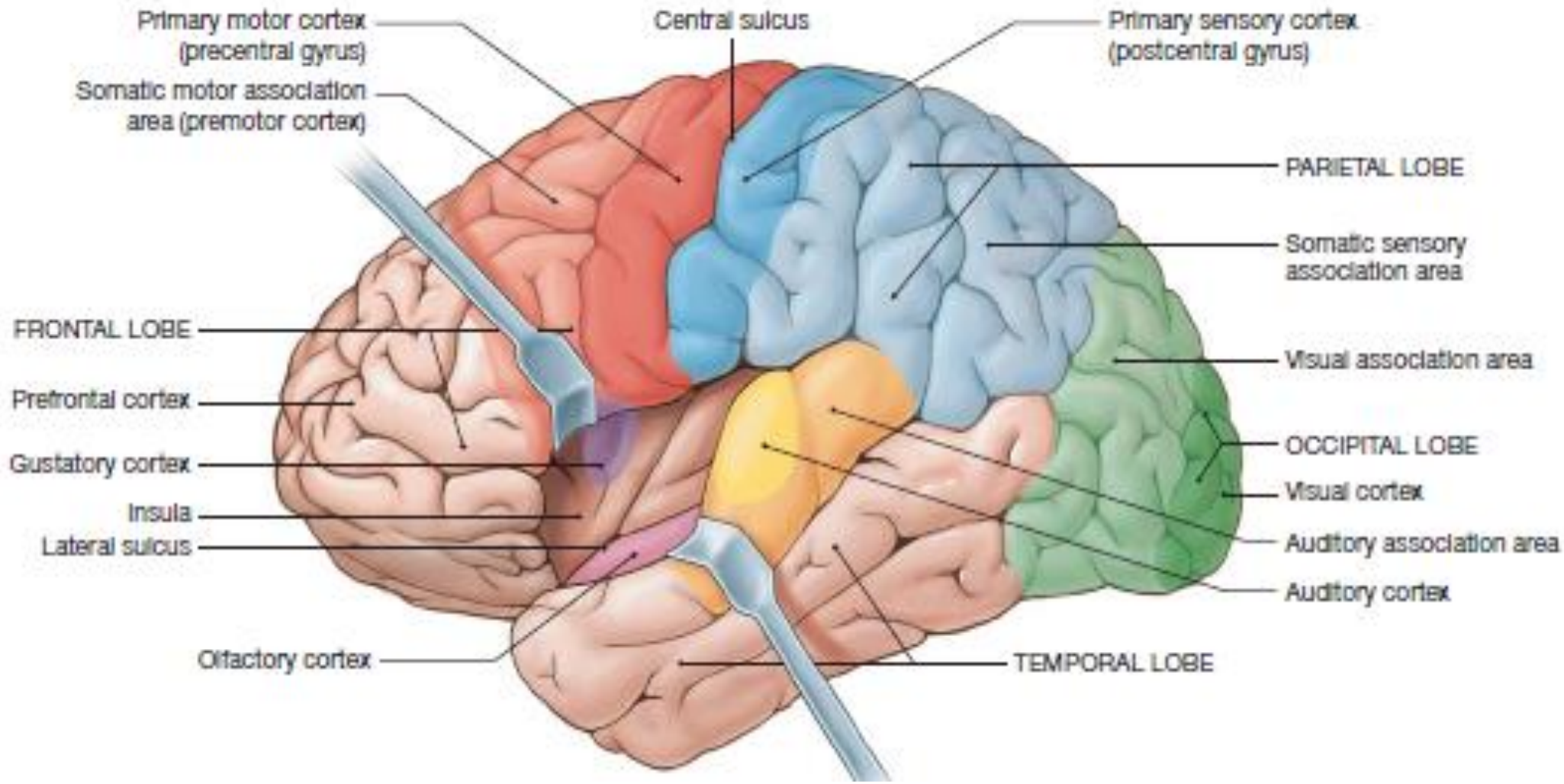
e 14–15 Motor and Sensory Regions of the Cerebral Cortex.



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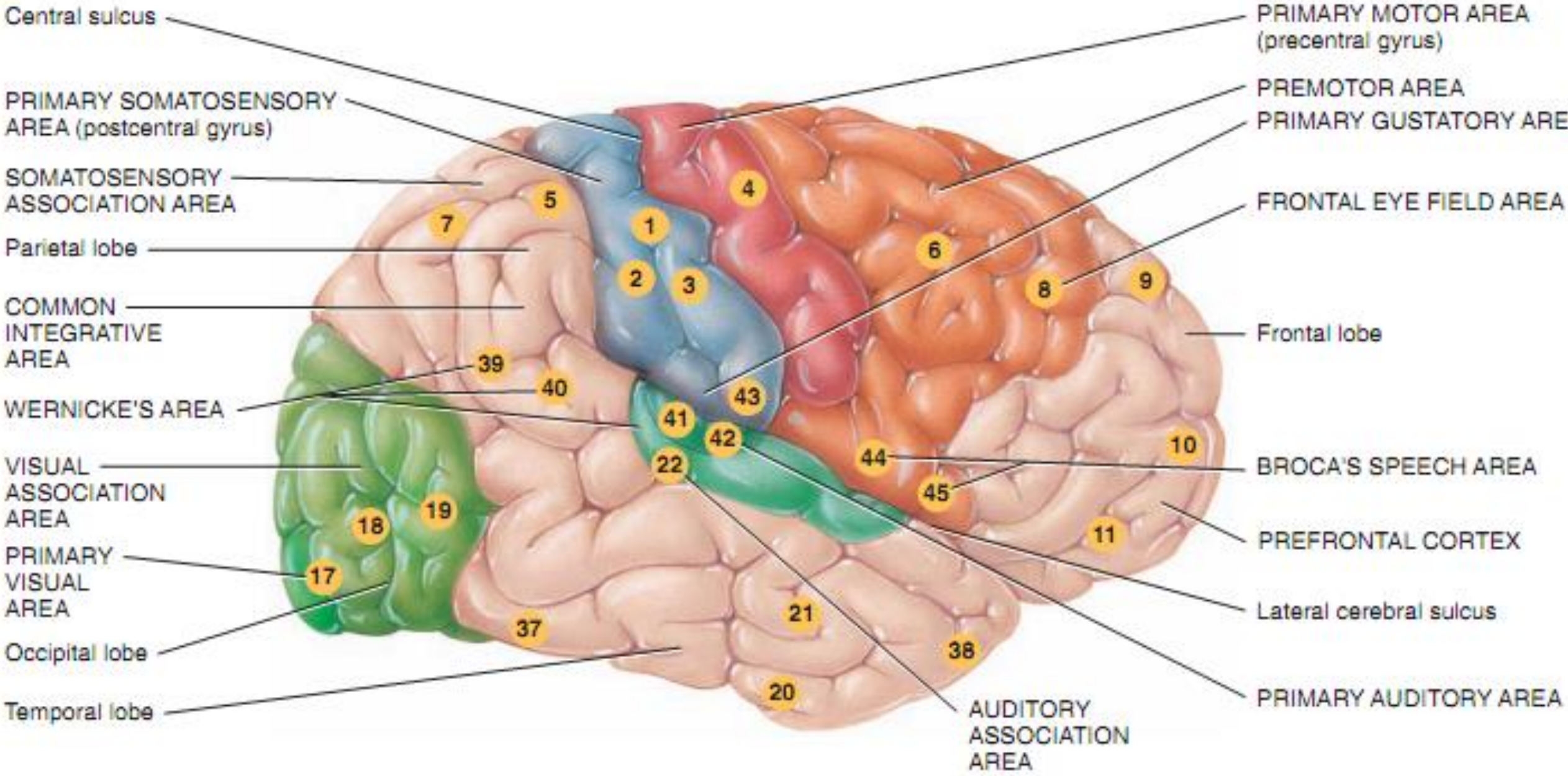
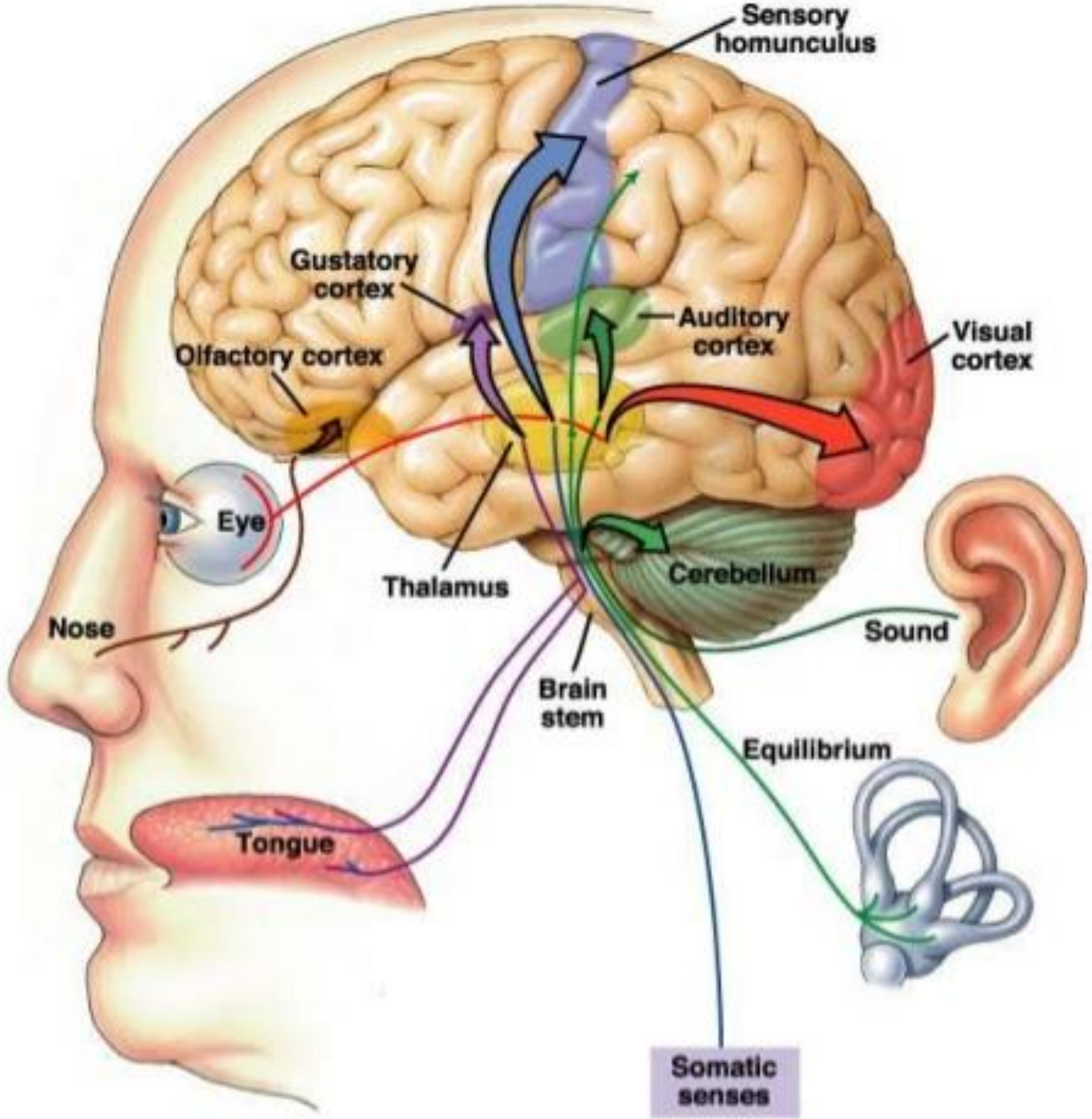
Particular areas of the cerebral cortex process sensory, motor, and integrative signals.



Lateral view of right cerebral hemisphere



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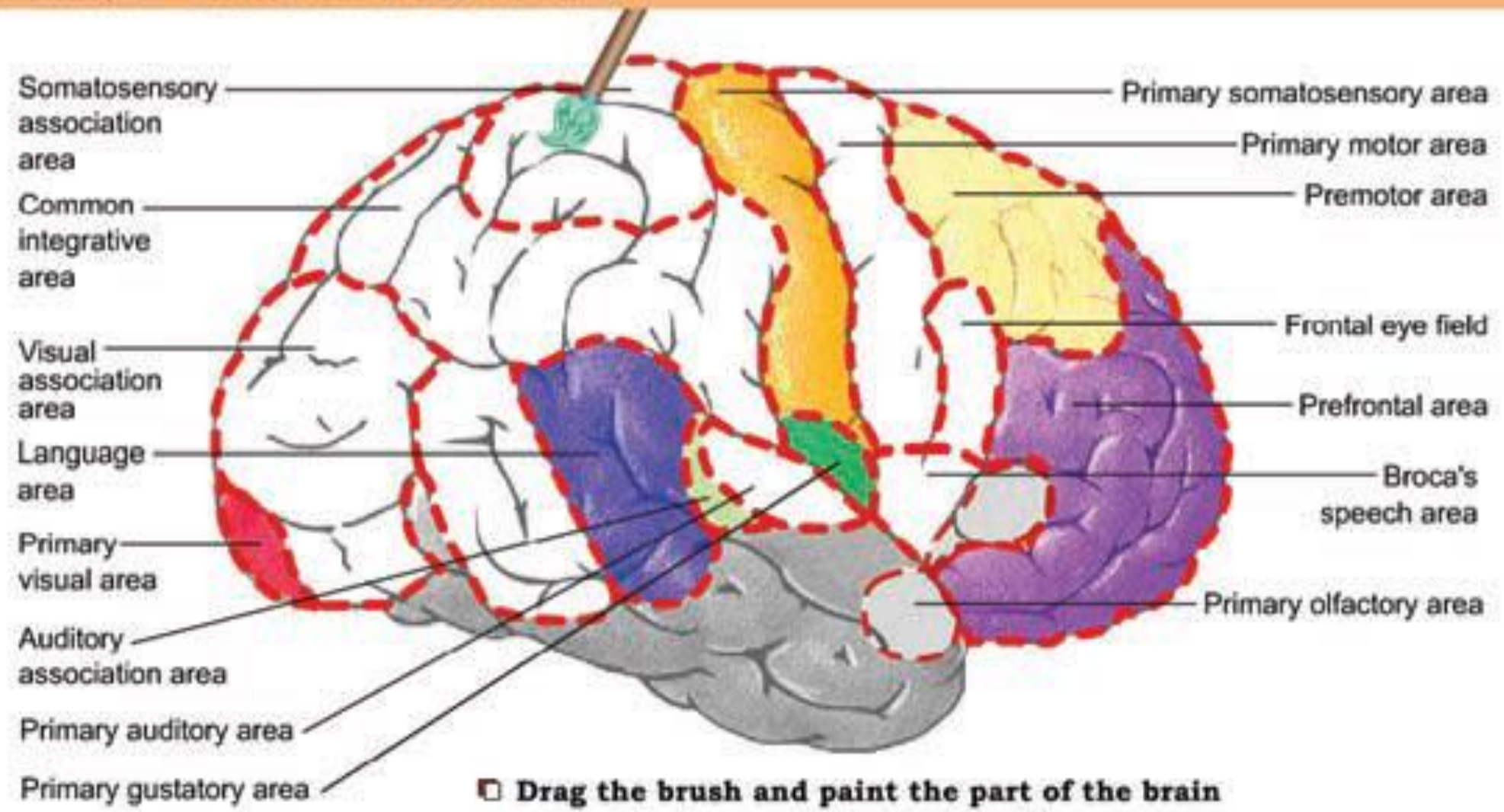
The Nervous System. **Paint the Functional Areas of the Cerebral Cortex.**



Drag the brush and paint the part of the brain cortex that serves following functions:

Interprets sensory information from all sources to provide for a suitable response.

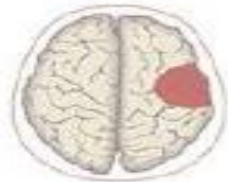
Site of lesion	Disorder	R	L
Frontal, either	Intellectual impairment Personality change Urinary incontinence Monoparesis or hemiparesis		
Frontal, left	Broca's aphasia		
Temporo-parietal, left	Acalculia Alexia Agraphia Wernicke's aphasia Right-left disorientation Homonymous field defect		
Temporal, right	Confusional states Failure to recognize faces Homonymous field defect		
Parietal, either	Contralateral sensory loss or neglect Agraphaesthesia Homonymous field defect		
Parietal, right	Dressing apraxia Failure to recognize faces		
Parietal, left	Limb apraxia		
Occipital/ occipitoparietal	Visual field defects Visuospatial defects Disturbances of visual recognition		

FIGURE 21-2 Principal features of destructive cortical lesions in a right-handed individual

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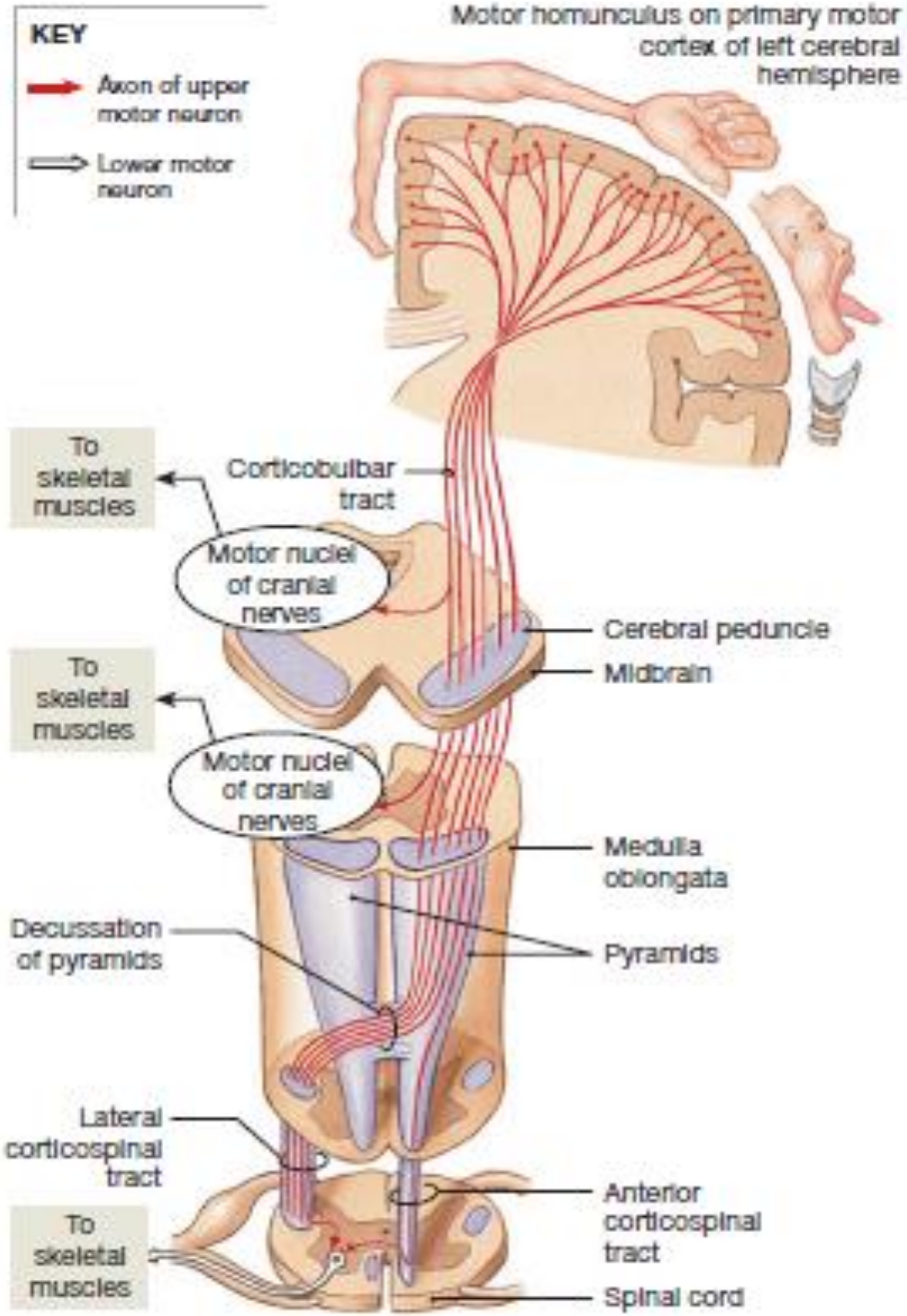

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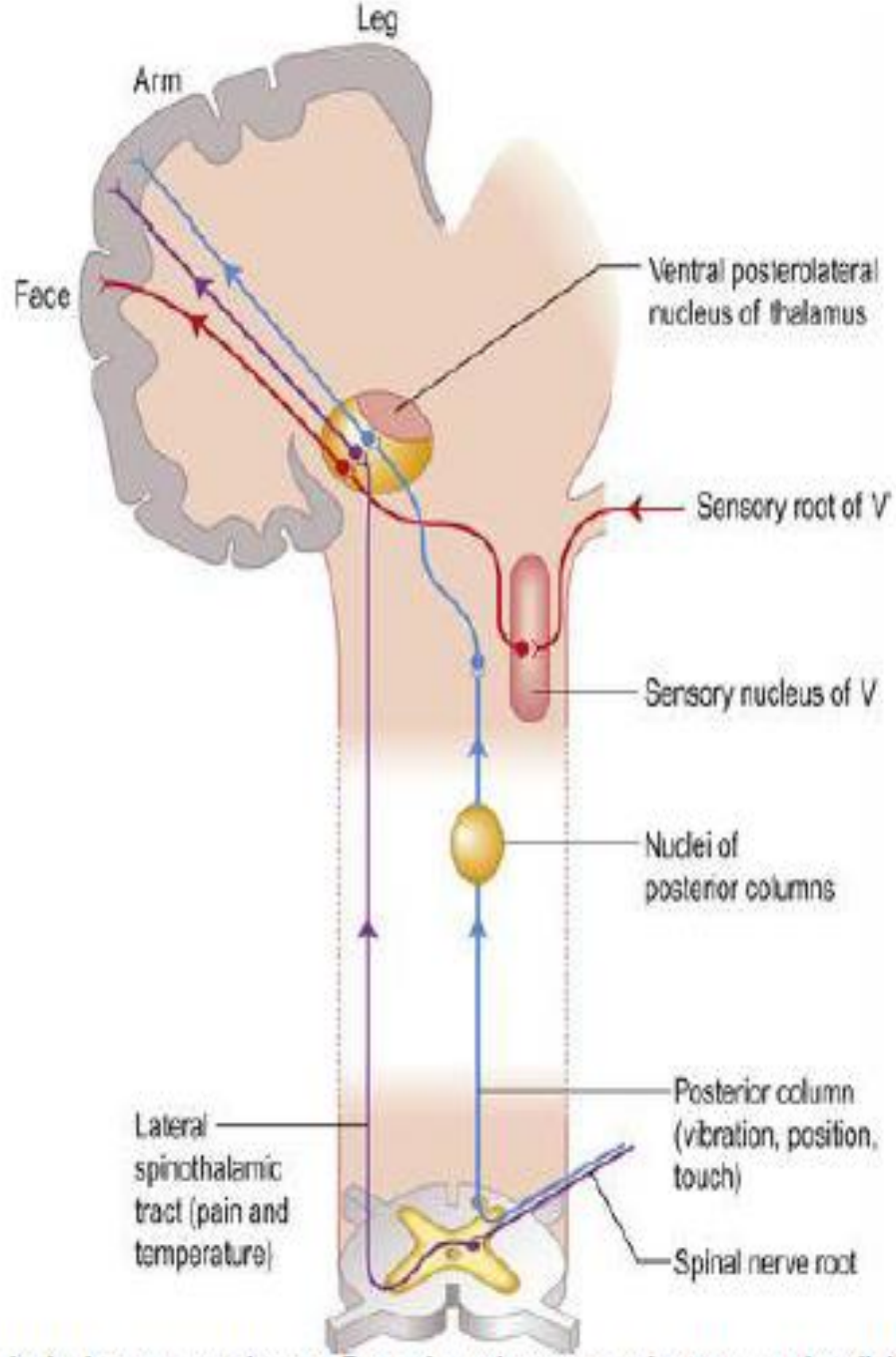

FIGURE 21.14 Principal sensory pathways. Posterior columns remain uncrossed until the medulla. Spinothalamic tracts cross close to their entry into the cord.

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CORTICOSPINAL TRACT
PYRAMIDAL TRACT

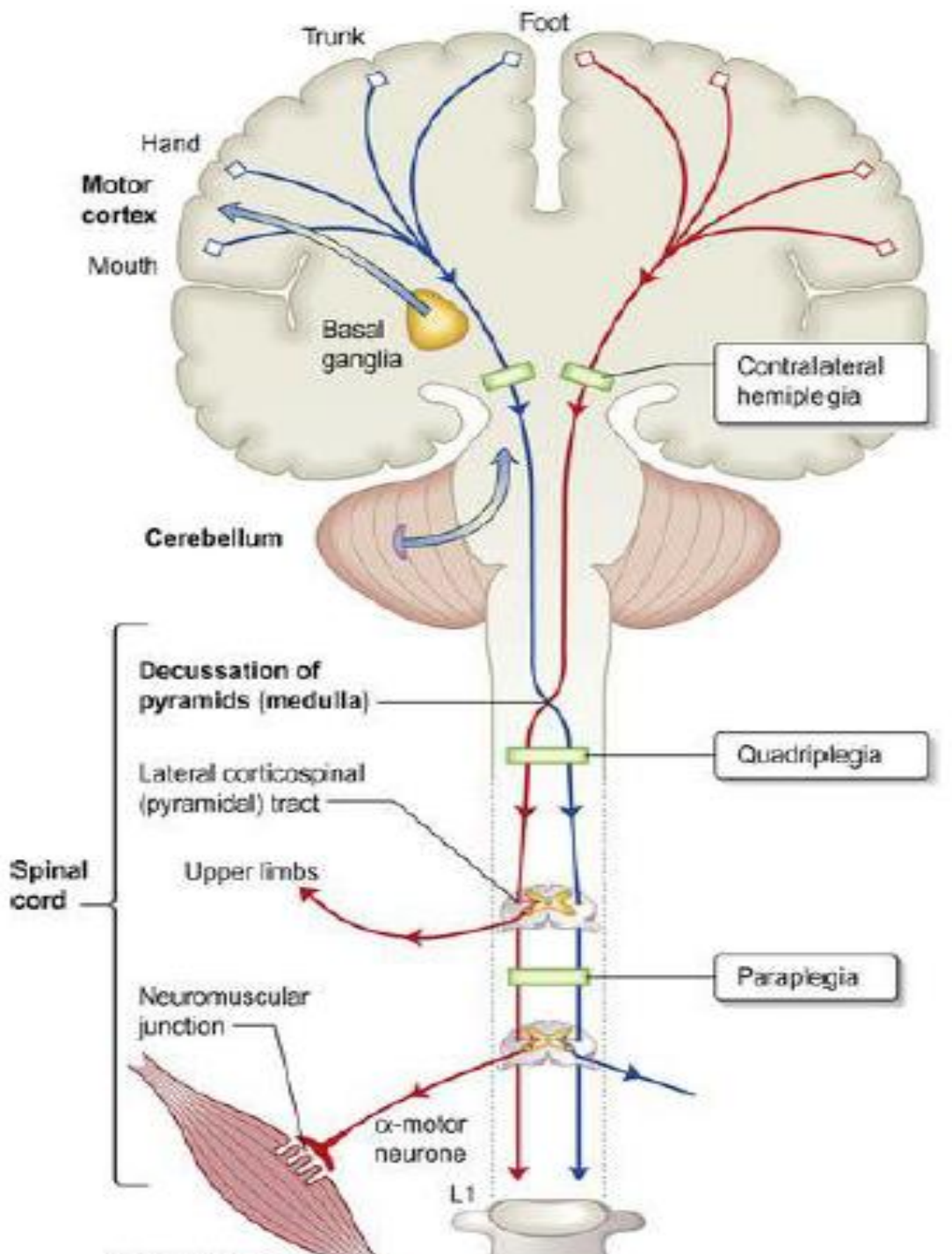

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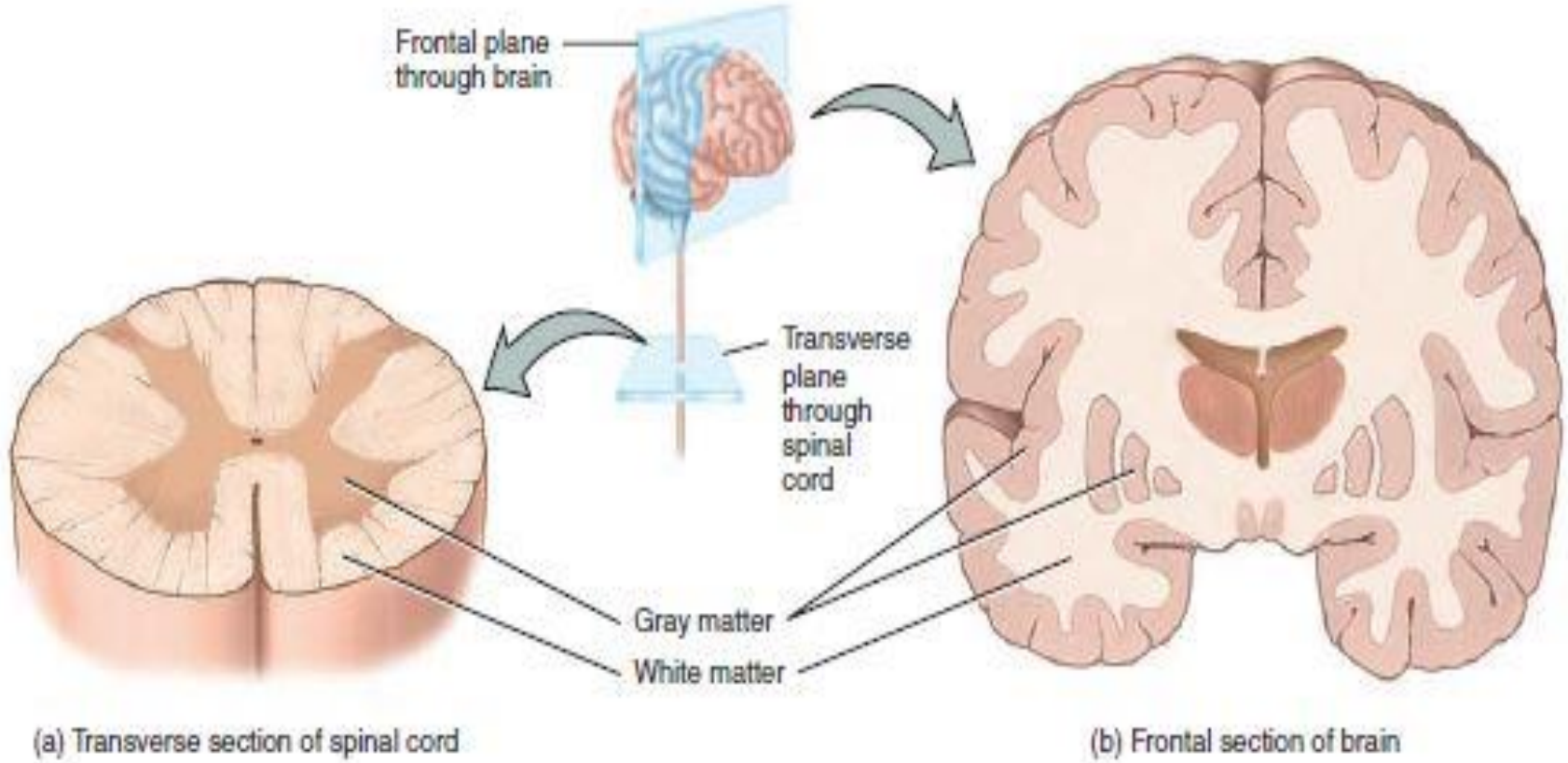
Figure 12.9 **Distribution of gray matter and white matter in the spinal cord and brain.**

White matter primarily consists of myelinated axons of many neurons. Gray matter consists of neuron cell bodies, dendrites, unmyelinated axons, axon terminals, and neuroglia.



What is responsible for the white appearance of white matter?

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Stroke.

To the public, stroke means weakness, usually permanent on one side, often with loss of speech.

Stroke is *defined* as a syndrome of rapid onset of neurological deficit caused by focal, cerebral, spinal or retinal infarction.

Tissue injury is confirmed by neuroimaging.

Hemiplegia following middle cerebral arterial thromboembolism is the typical example.

- **ischaemic stroke/infarction (85%)**
  - **thrombotic**
  - **large-artery stenosis**
  - **small-vessel disease**
  - **cardio-embolic**
  - **hypoperfusion**
- **haemorrhagic stroke (10%)**
  - **intracerebral haemorrhage–**
  - **-subarachnoid haemorrhage**
- **other (5%), e.g. arterial dissection, venous sinus thrombosis, vasculitis**

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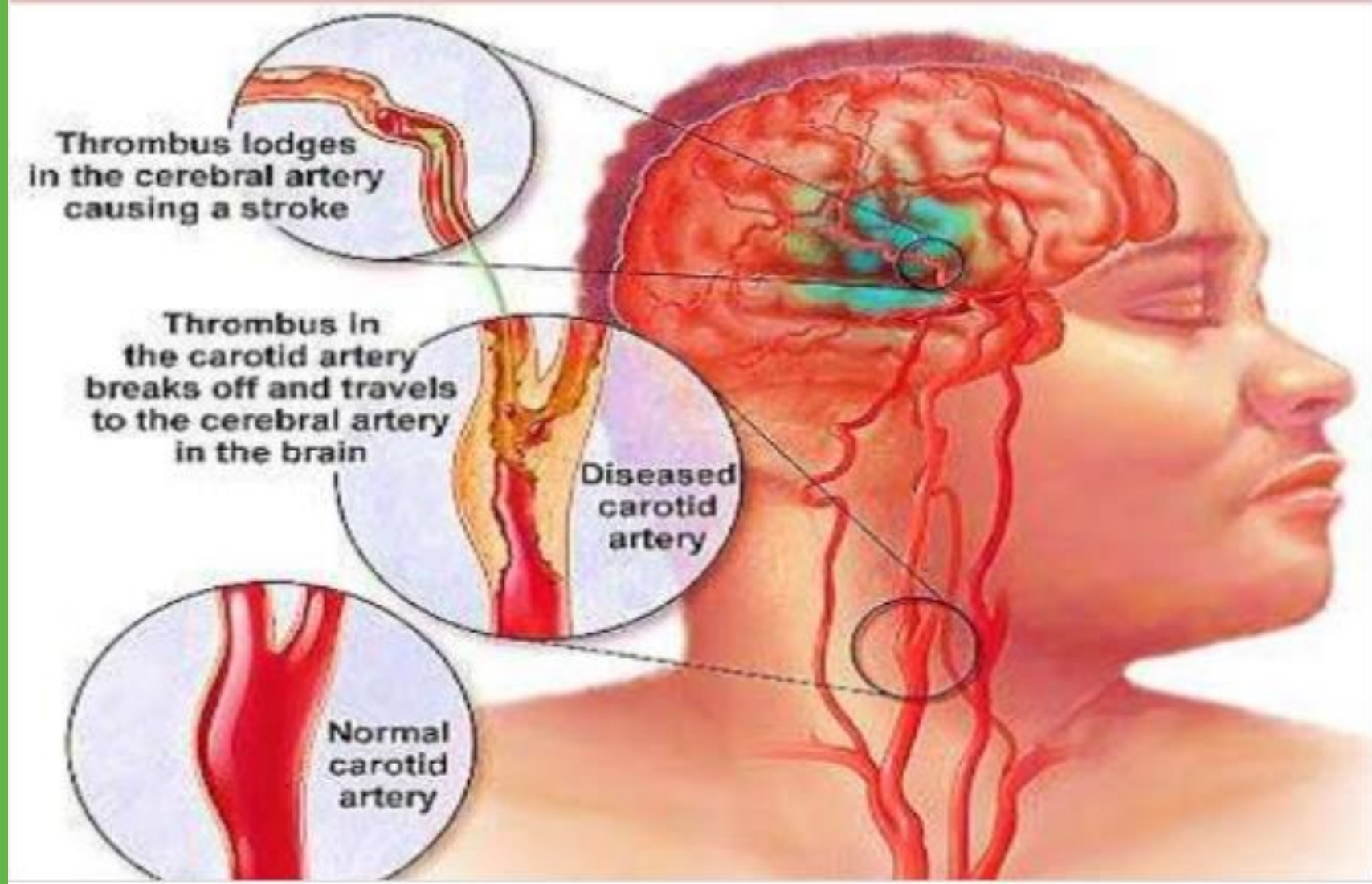
How stroke happens……

Recortar slide



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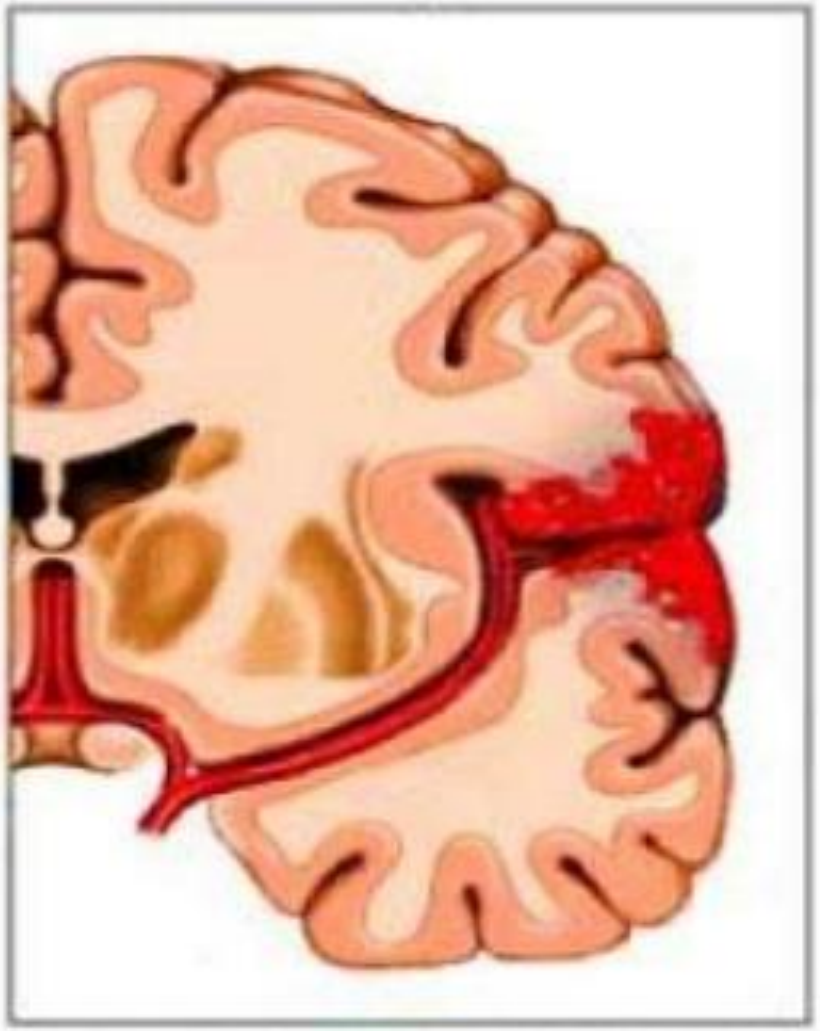
TYPES OF STROKE

Recortar slide

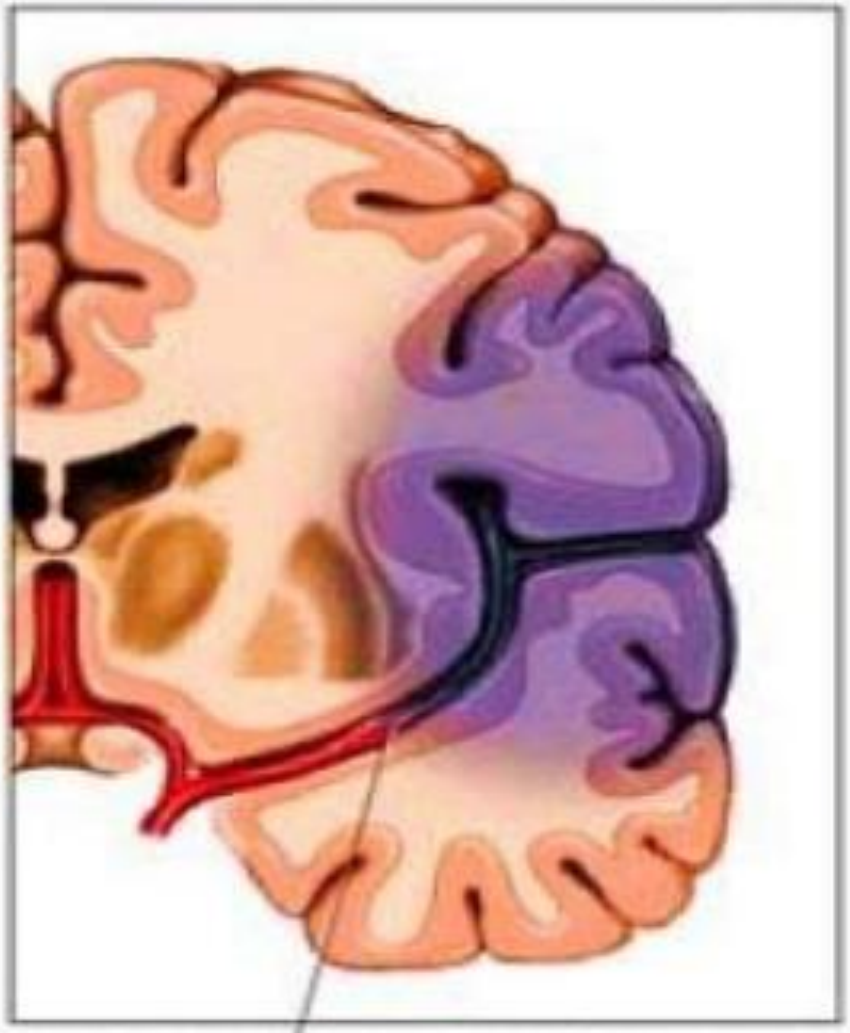
i-CARE

Hemorrhagic Stroke



Hemorrhage/blood leaks

Ischemic Stroke



Clot stops blood supply

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INTRACEREBRA
L HEMORHAGE

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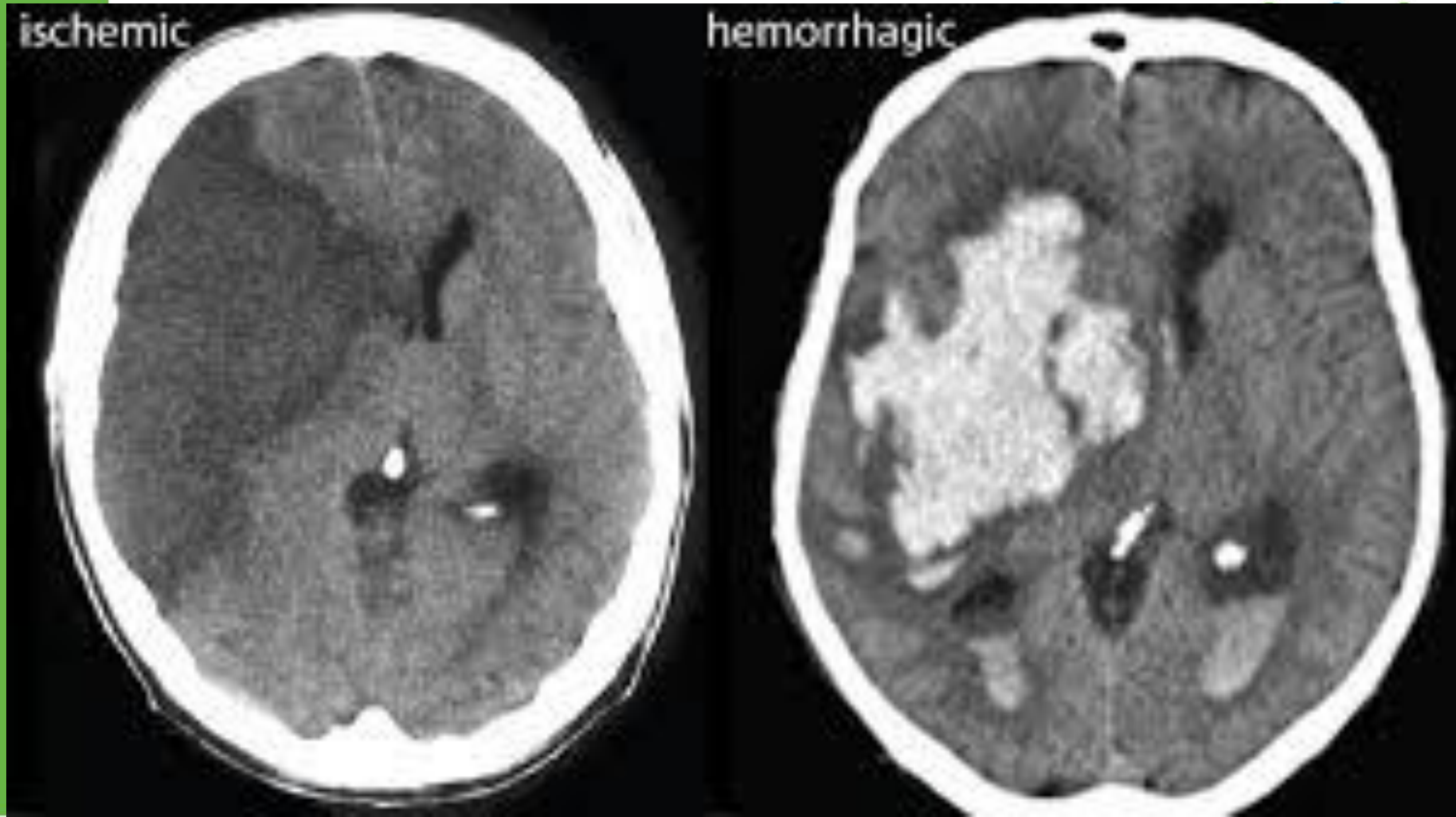
ischemic
hemorrhagic

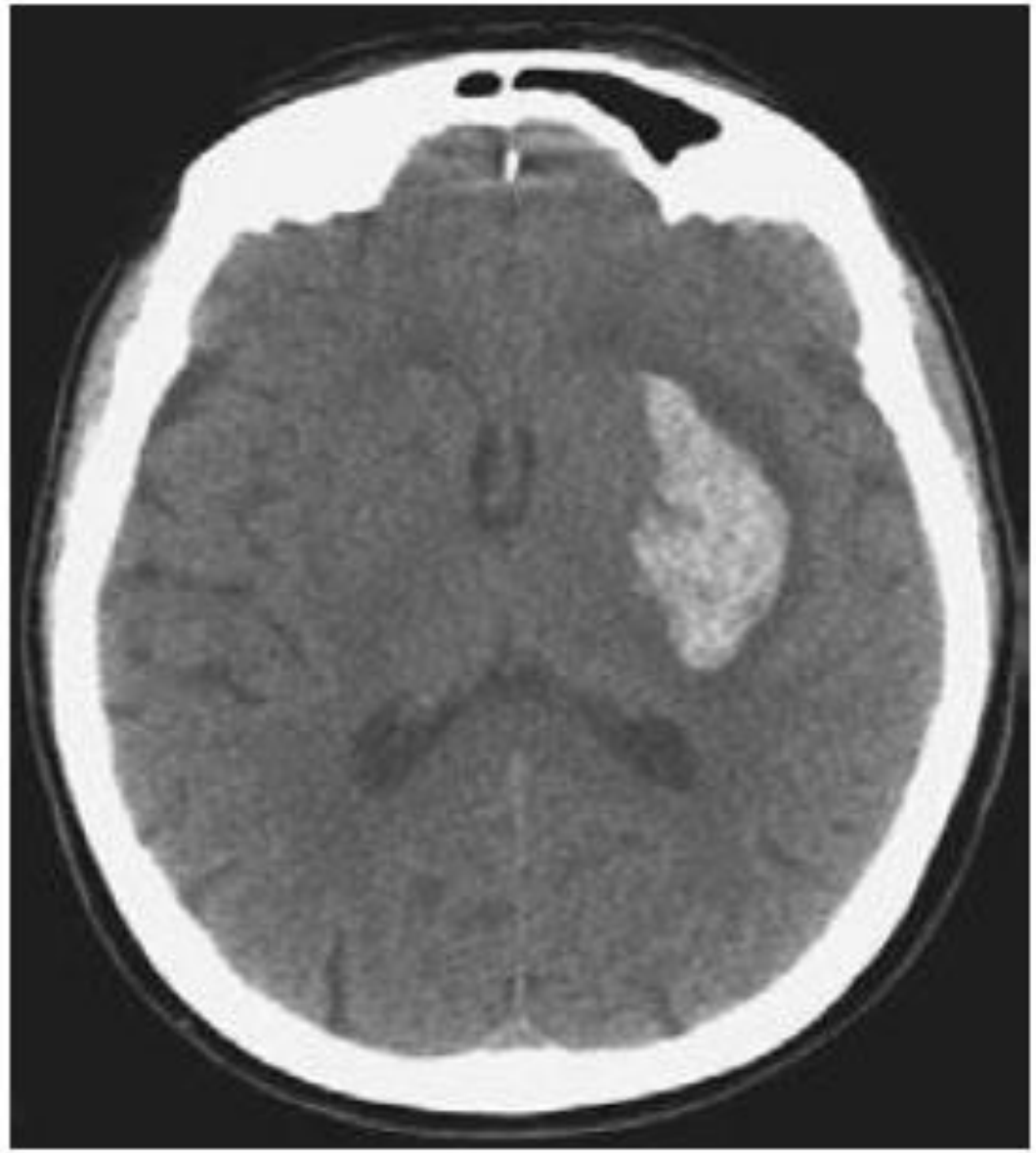

FIGURE 446-17 Hypertensive hemorrhage. Transaxial noncontrast computed tomography scan through the region of the basal ganglia reveals a hematoma involving the left putamen in a patient with rapidly progressive onset of right hemiparesis.

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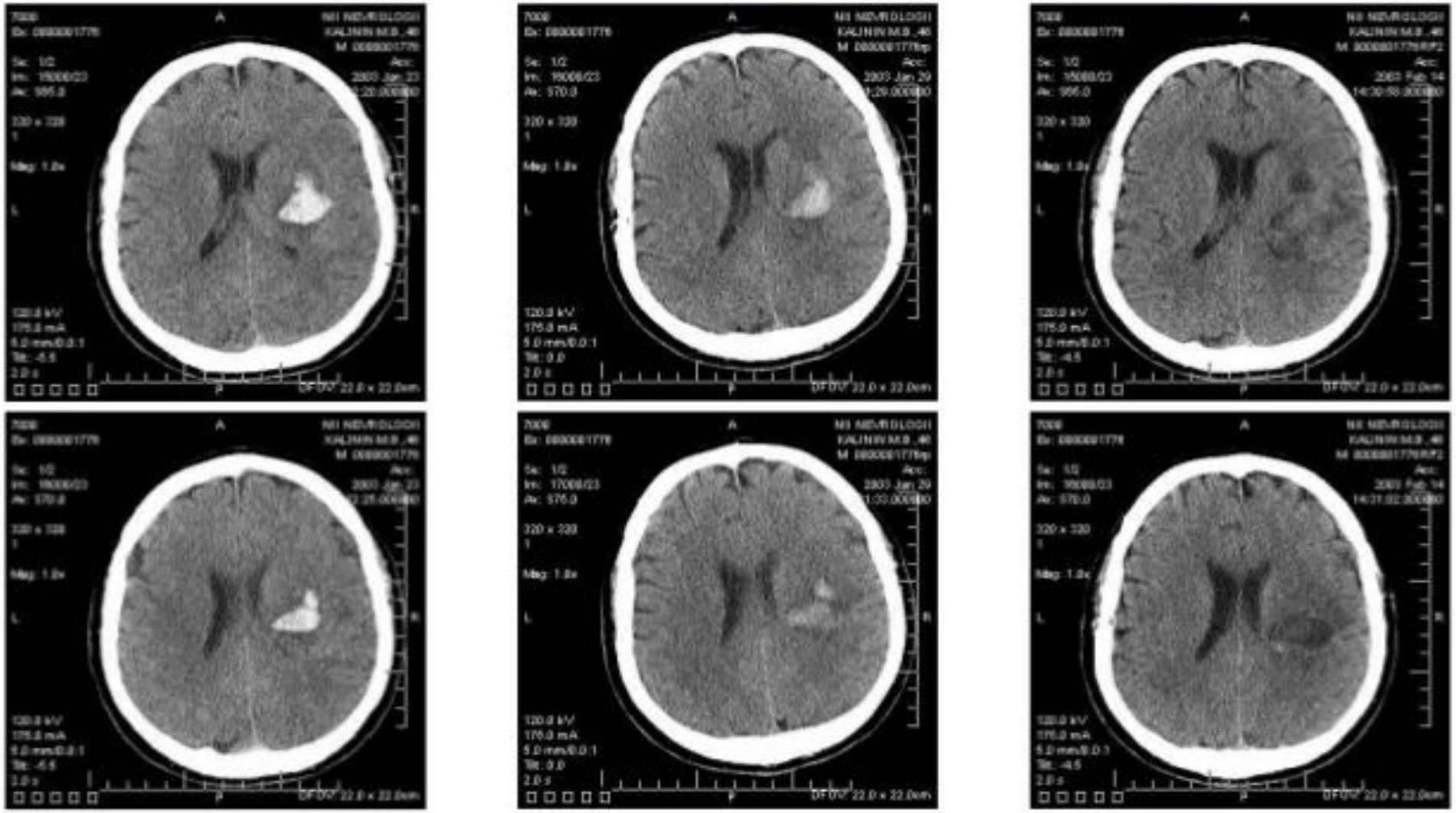
Intracerebral hemorrhage in different periods



1 day

7 days

16 days

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Prognosis

About 25% of patients die within 2 years of a stroke, nearly 10% within the first month .

This early mortality is higher following intracranial haemorrhage than ischaemic stroke.

Poor outcome is likely when there is coma, a defect in conjugate gaze and hemiplegia.

Many complications, such as aspiration or pressure ulcers, are preventable, particularly in the elderly.

Coordinated care reduces deaths.

Recurrent strokes are, however, common (10% in the first year) and many patients die subsequently from myocardial infarction.

Of initial stroke survivors, some 30–40% remain alive at 3 years.

Gradual improvement usually follows stroke, with recovery plateauing after 12 months.

One-third of survivors return to independent mobility and one-third have disability requiring institutional care.

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- **Problem solving process** (WHO, Wade, 2005)
  - **Assessment**
  - **Identify needs/modifiable factors**
  - **Goal setting**
  - **Measurement, planning & implementation of interventions**
  - **Evaluation of change & effectiveness**

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Rehabilitation: multidisciplinary approach

Physiotherapy has particular value in the first few weeks after stroke to relieve spasticity, prevent contractures and teach patients to use walking aids.

Speech and language therapists have a vital understanding of aphasic patients' problems and frustration.

Return of speech is hastened by conversation generally.

Physiotherapy, occupational and speech therapy have a vital role in assessing and facilitating the future care pathway.

At home, aids and alterations may be needed: stair and bath rails, portable lavatories, hoists, sliding boards, wheelchairs, tripods, stair lifts, electric blinds and modified sleeping arrangements, kitchen, steps, flooring and doorways.

Liaison between hospital-based and community care teams, and primary care physician, is essential.

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• Stroke unit

- greater focus in acute stroke management
- geographically discrete units
- comprehensive ax
- MD team approach
- clear communication within team/family/patient
- promote early mobilisation
- strong engagement with carers/families
- staffed by professionals with special interest in stroke

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Thank You

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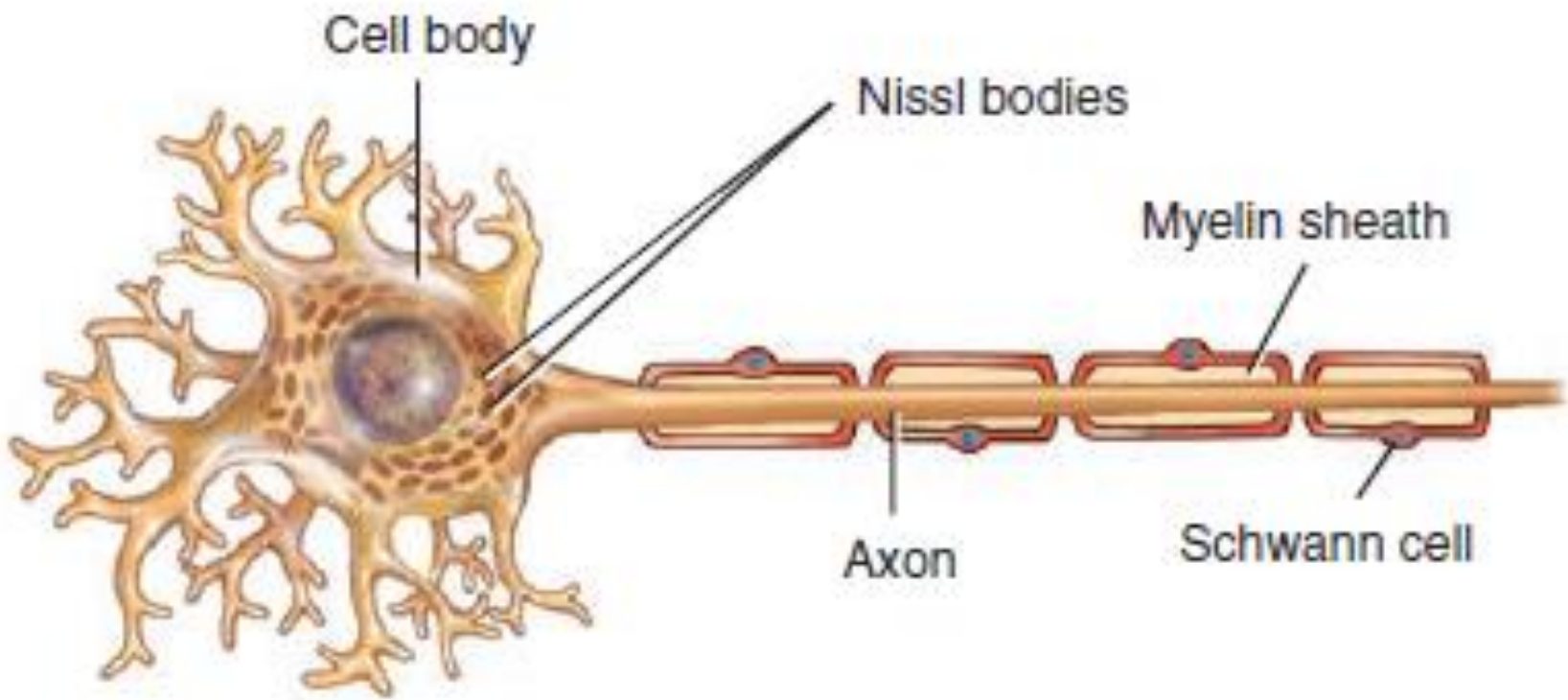
Figure 12.28 Damage and repair of a neuron in the PNS.

6 Myelinated axons in the peripheral nervous system may be repaired if the cell body remains intact and if Schwann cells remain active.



(a) Normal neuron

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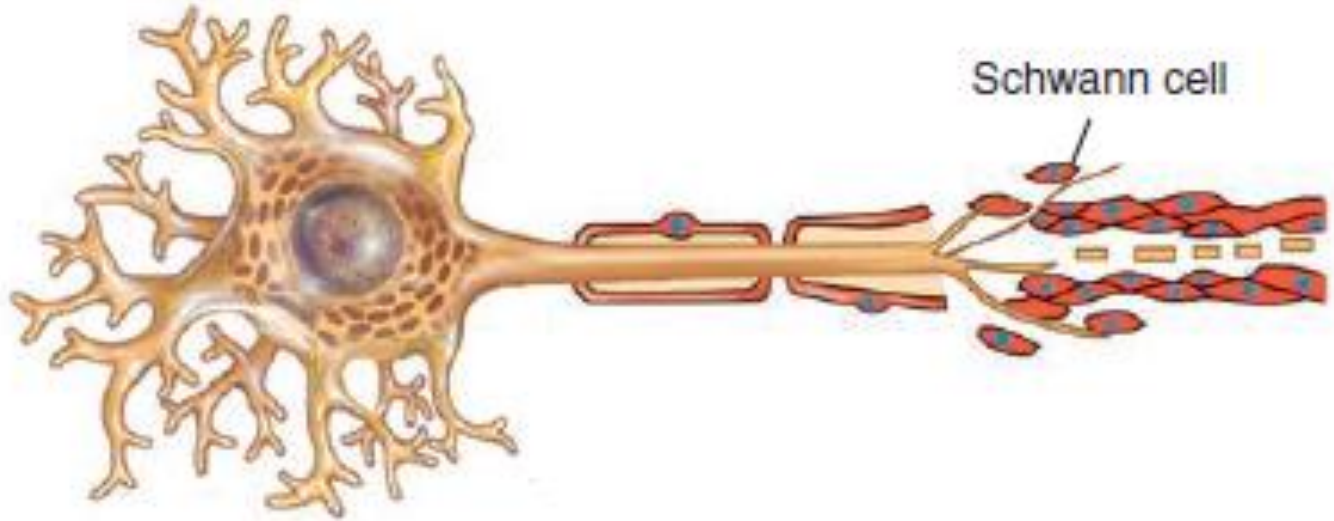
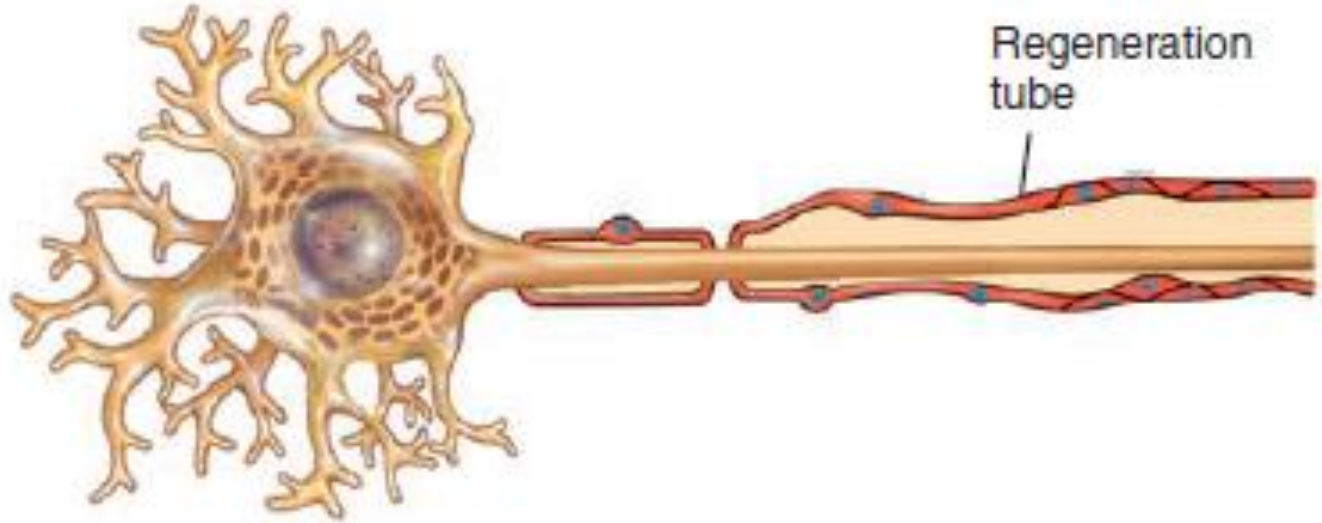


(b) Chromatolysis and Wallerian degeneration



(c) Regeneration

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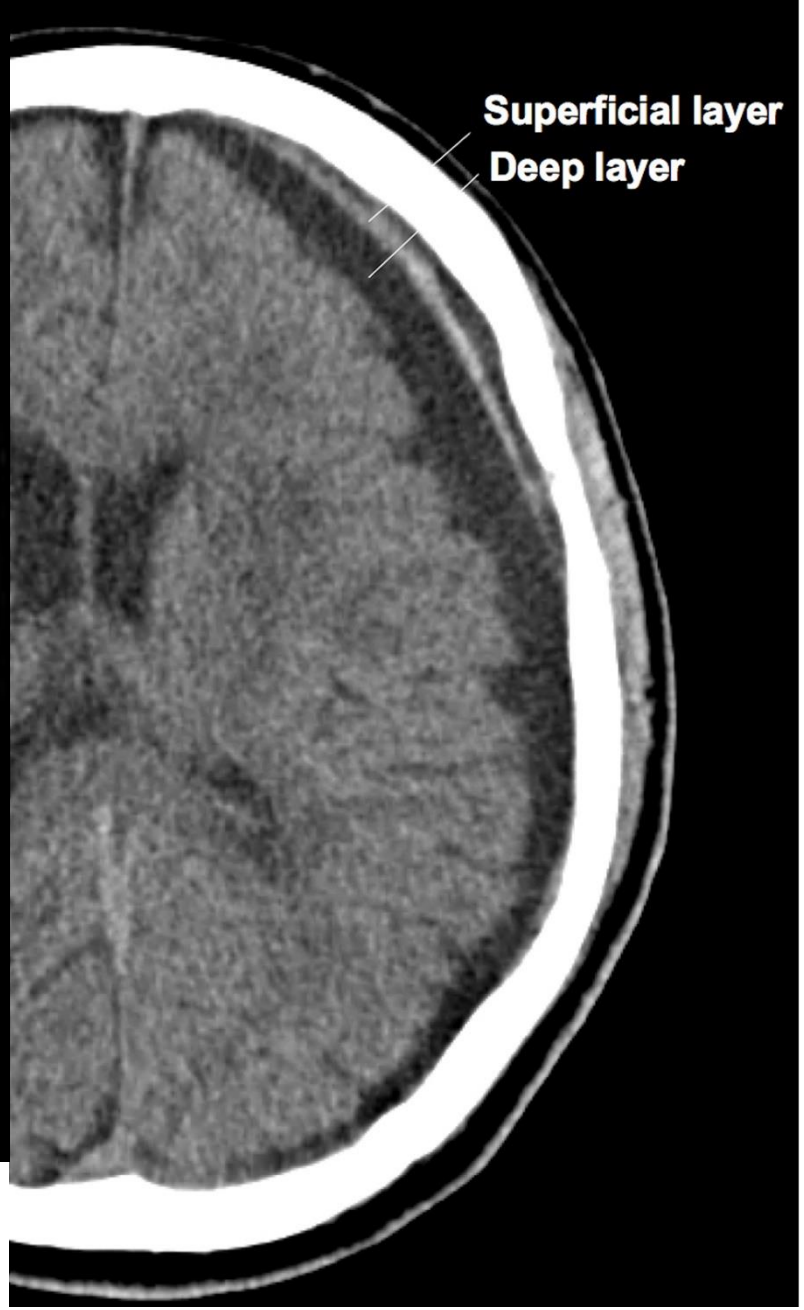

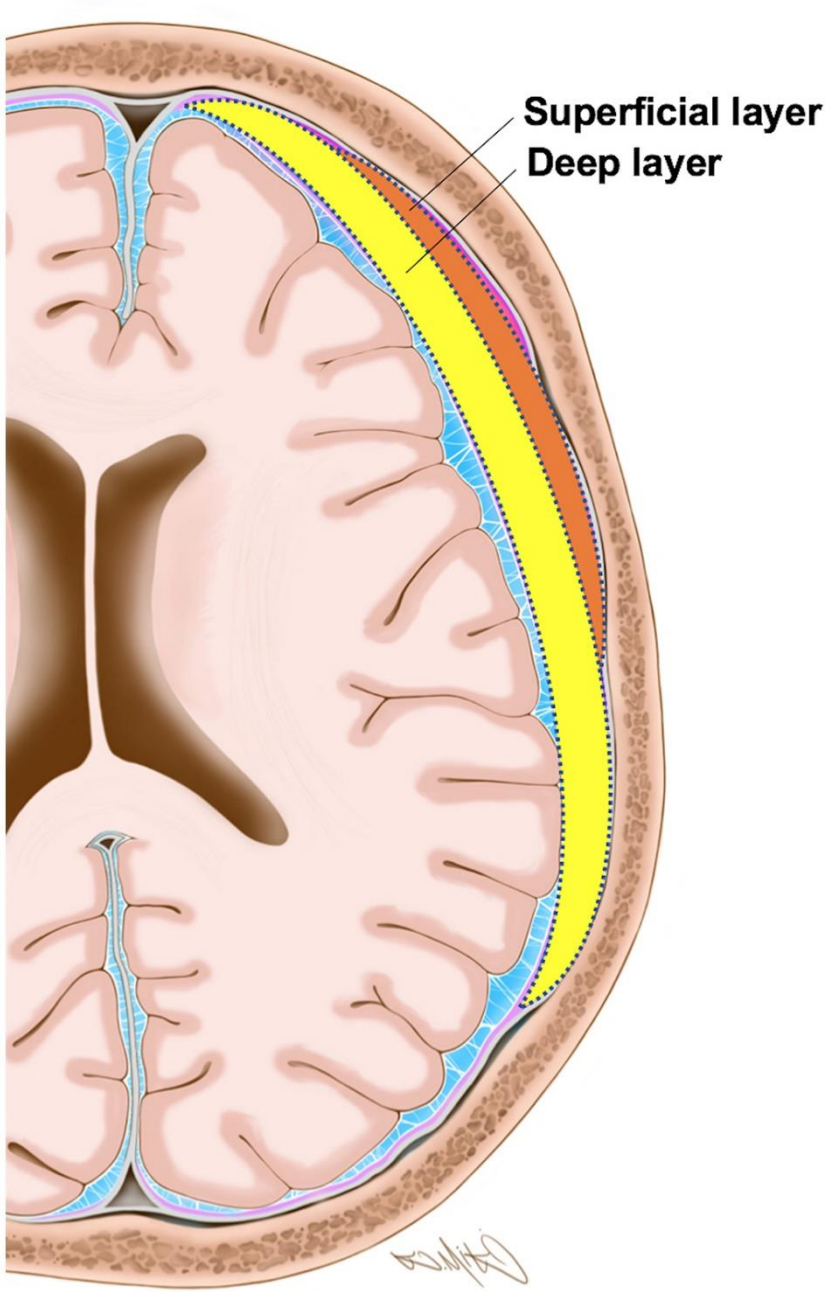

SUBDURALHEMATOMA

ACUTE AND

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Important points to remember:

1. **The goal of rehab is to help patients be independent** — doing as much for themselves as they can.
2. **Rehab is done with a patient, not to a patient.**

Your family member must be willing and able to work with rehab services during active treatment and, later, with caregivers or by themselves at home.

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SUBARACHNOID HEMORHAGE

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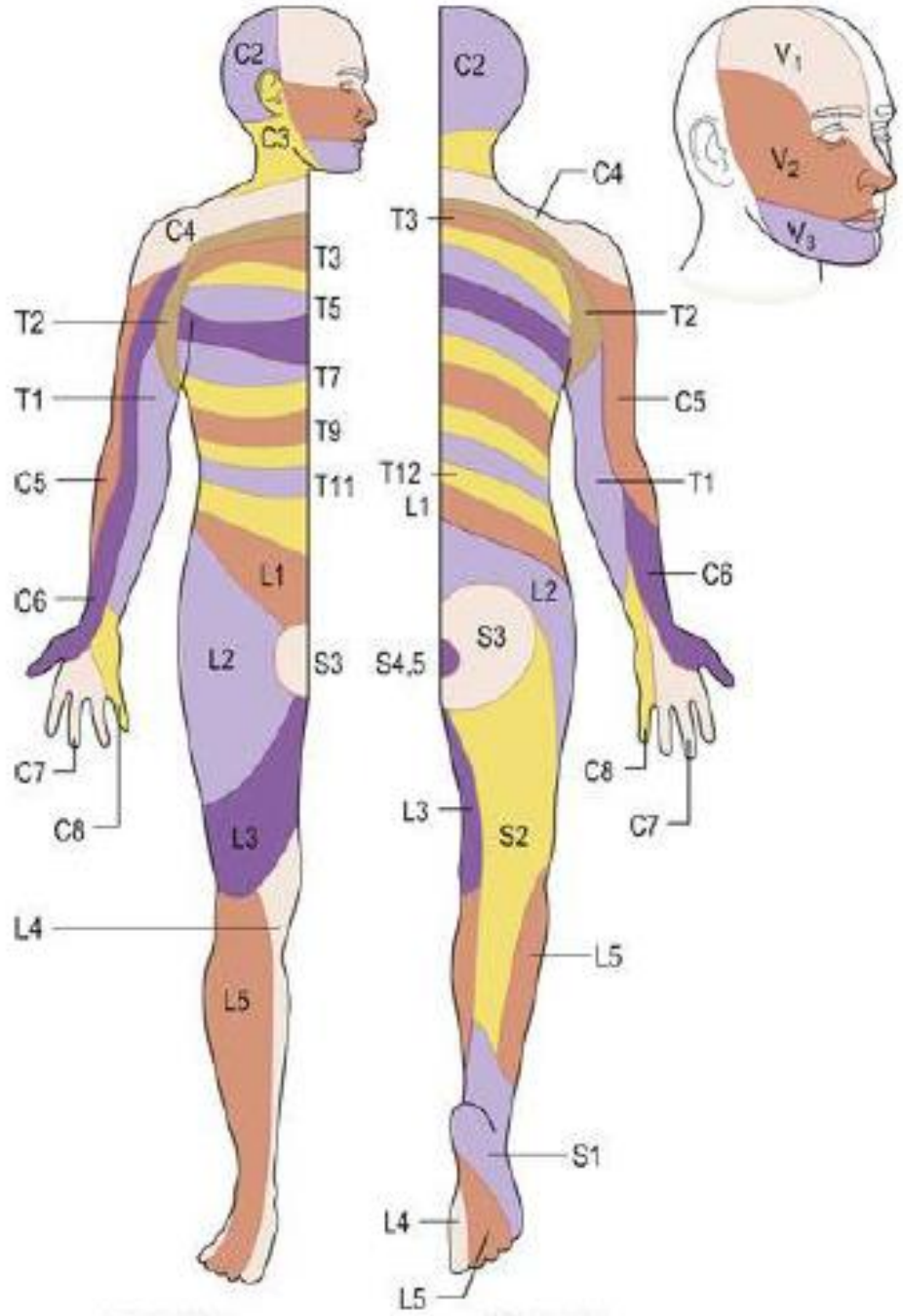

Dermatomes of spinal roots and Vth nerve.

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Traumatic Brain Injury

In most Western countries, head injury accounts for about 250 hospital admissions per 100 000 population annually.

Traumatic brain injury (TBI) describes injuries with potentially permanent consequences

The prevalence of survivors with a major persisting handicap is around 100/100 000.

Road traffic accidents and excessive alcohol use are the principal aetiological factors in this major cause of morbidity and mortality, in many countries.

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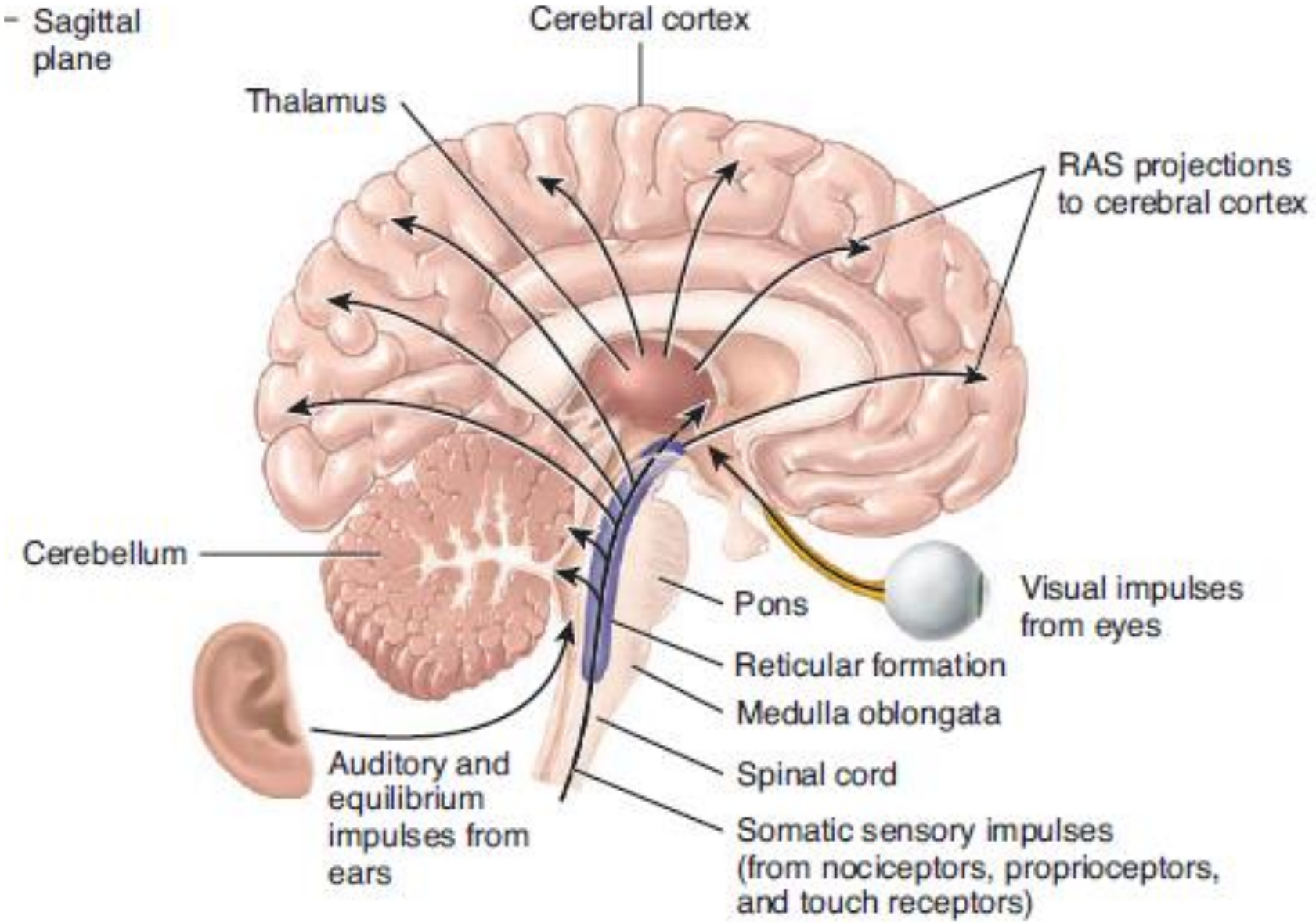
- Sagittal plane



(c) Sagittal section through brain and spinal cord showing the reticular formation

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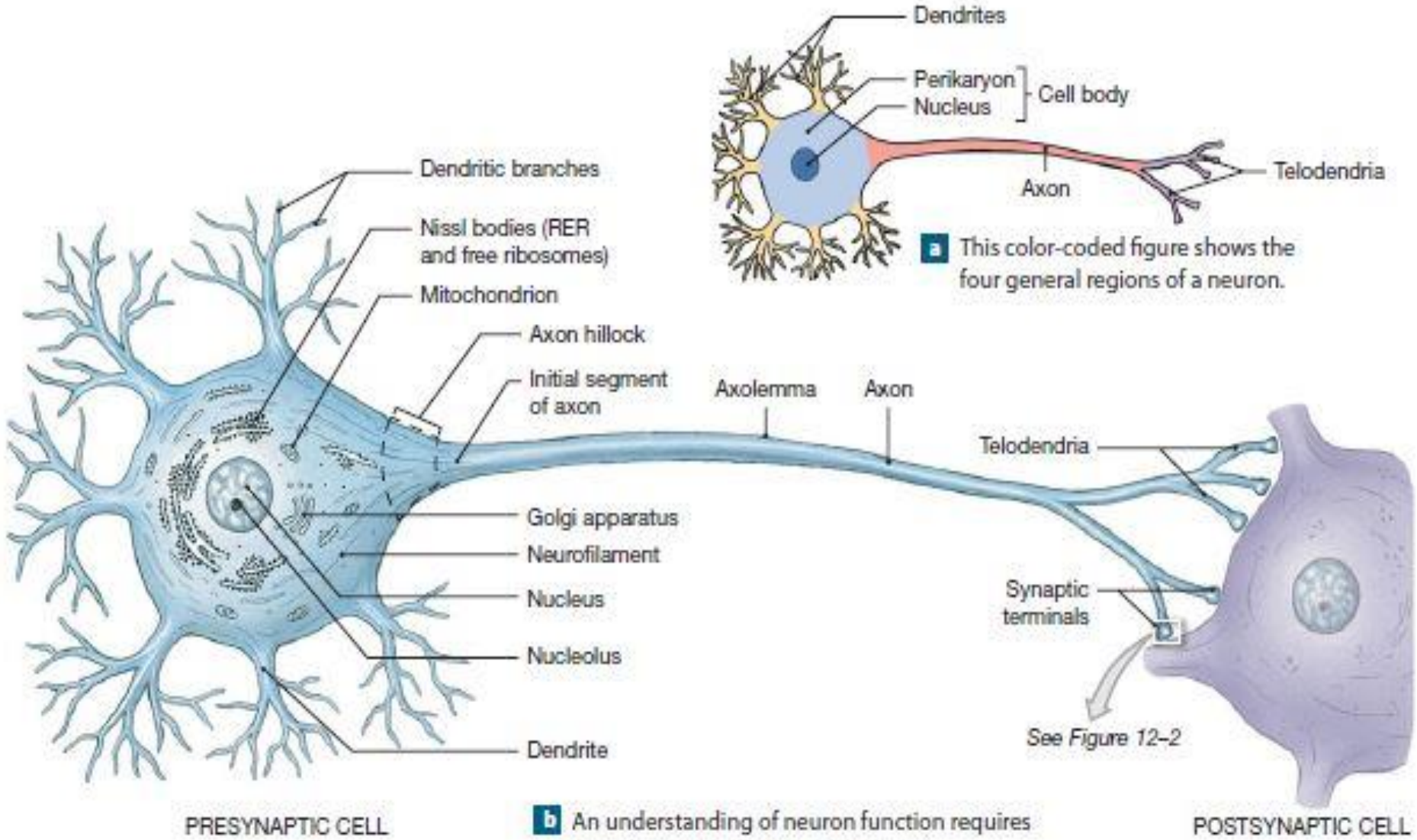
Figure 12–1 The Anatomy of a Multipolar Neuron.



a This color-coded figure shows the four general regions of a neuron.

b An understanding of neuron function requires knowing its structural components.

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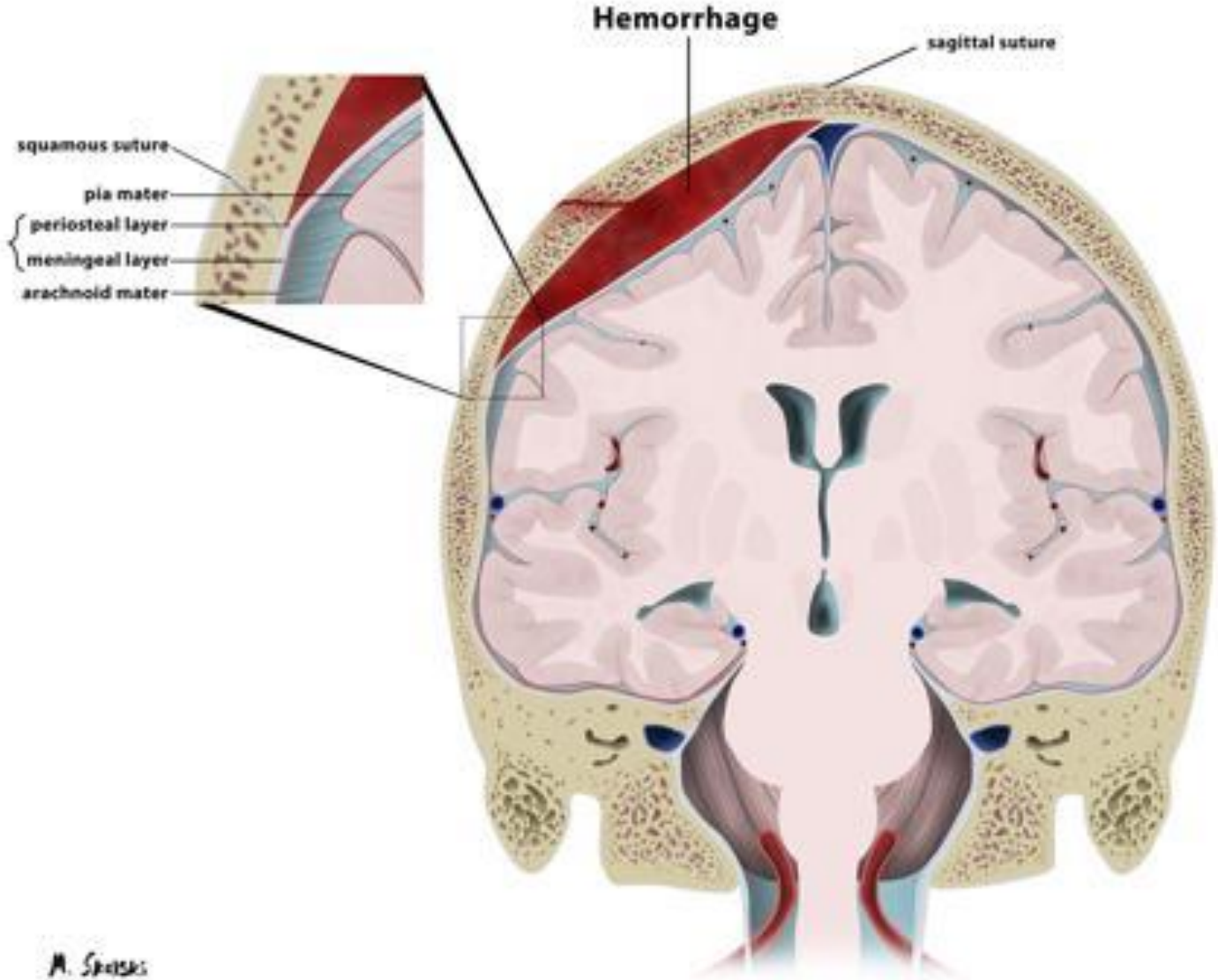
Extradural Hemorrhage



Radiopaedia.org

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EXTRA DURAL HEMATOMA USULY POST TRUMATIC

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