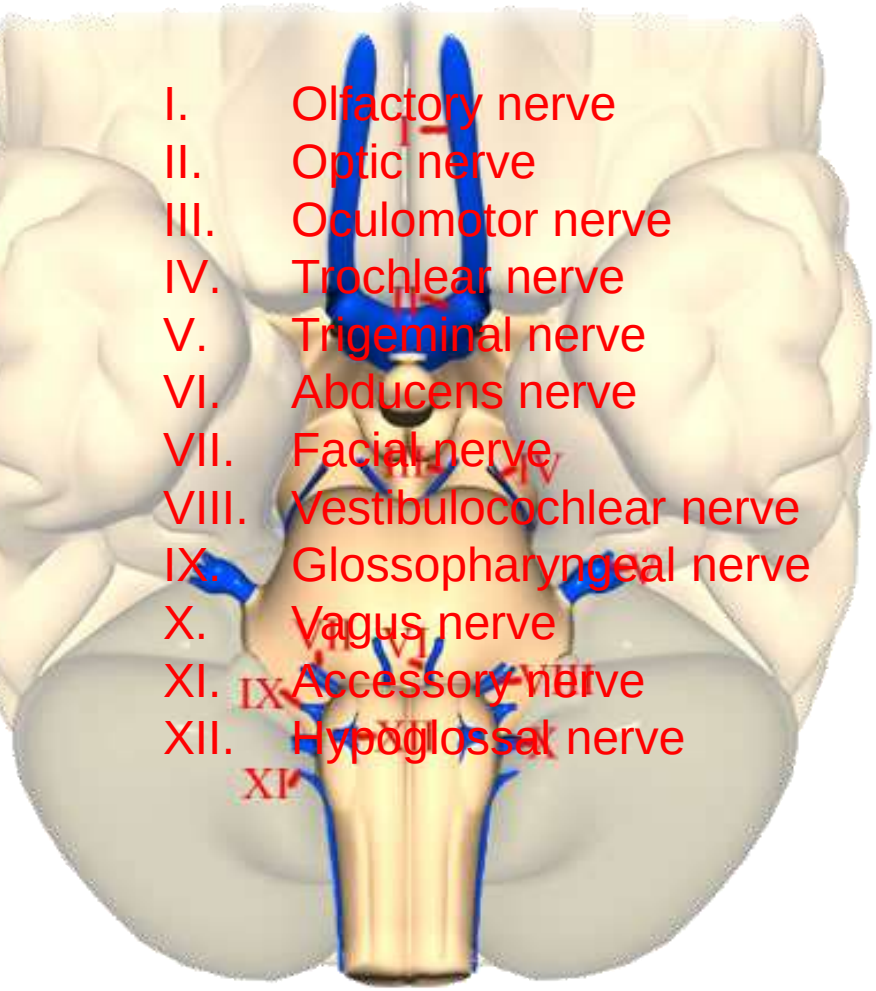
CEREBRO PANCA 1



I. Olfactory nerve
II. Optic nerve
III. Oculomotor nerve
IV. Trochlear nerve
V. Trigeminal nerve
VI. Abducens nerve
VII. Facial nerve
VIII. Vestibulocochlear nerve
IX. Glossopharyngeal nerve
X. Vagus nerve
XI. Accessory nerve
XII. Hypoglossal nerve

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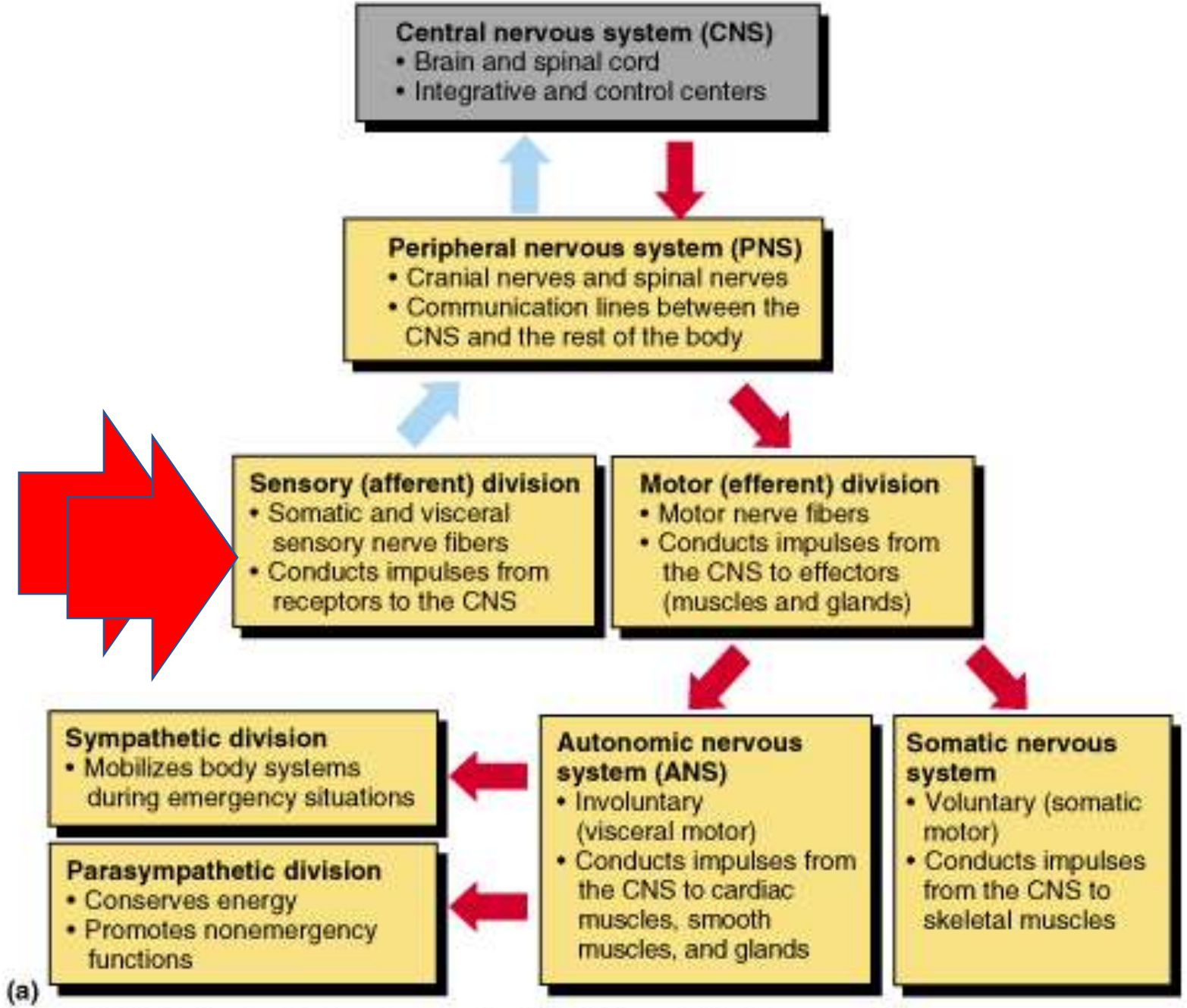


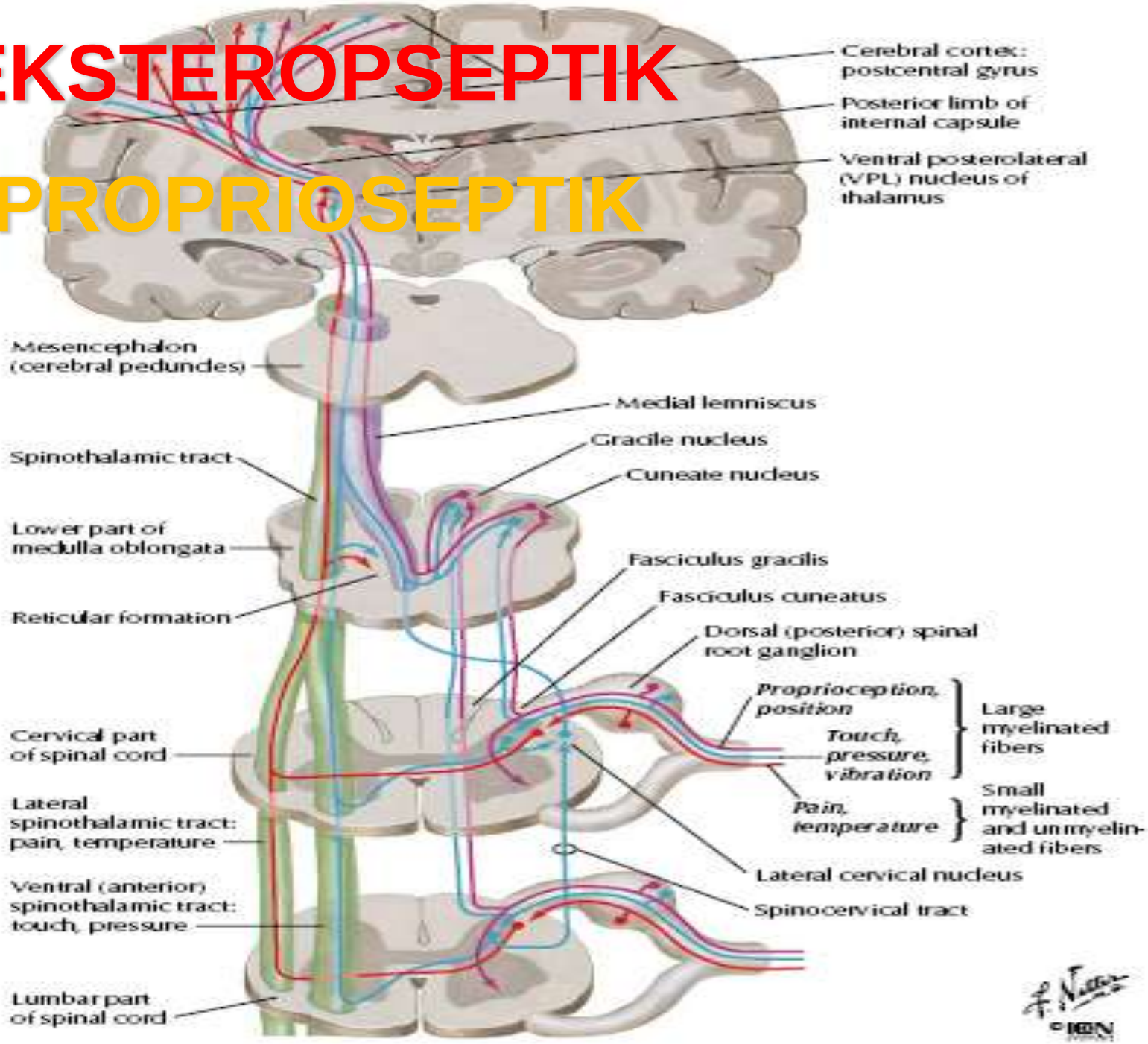
(a)

SISTEM SENSORIK

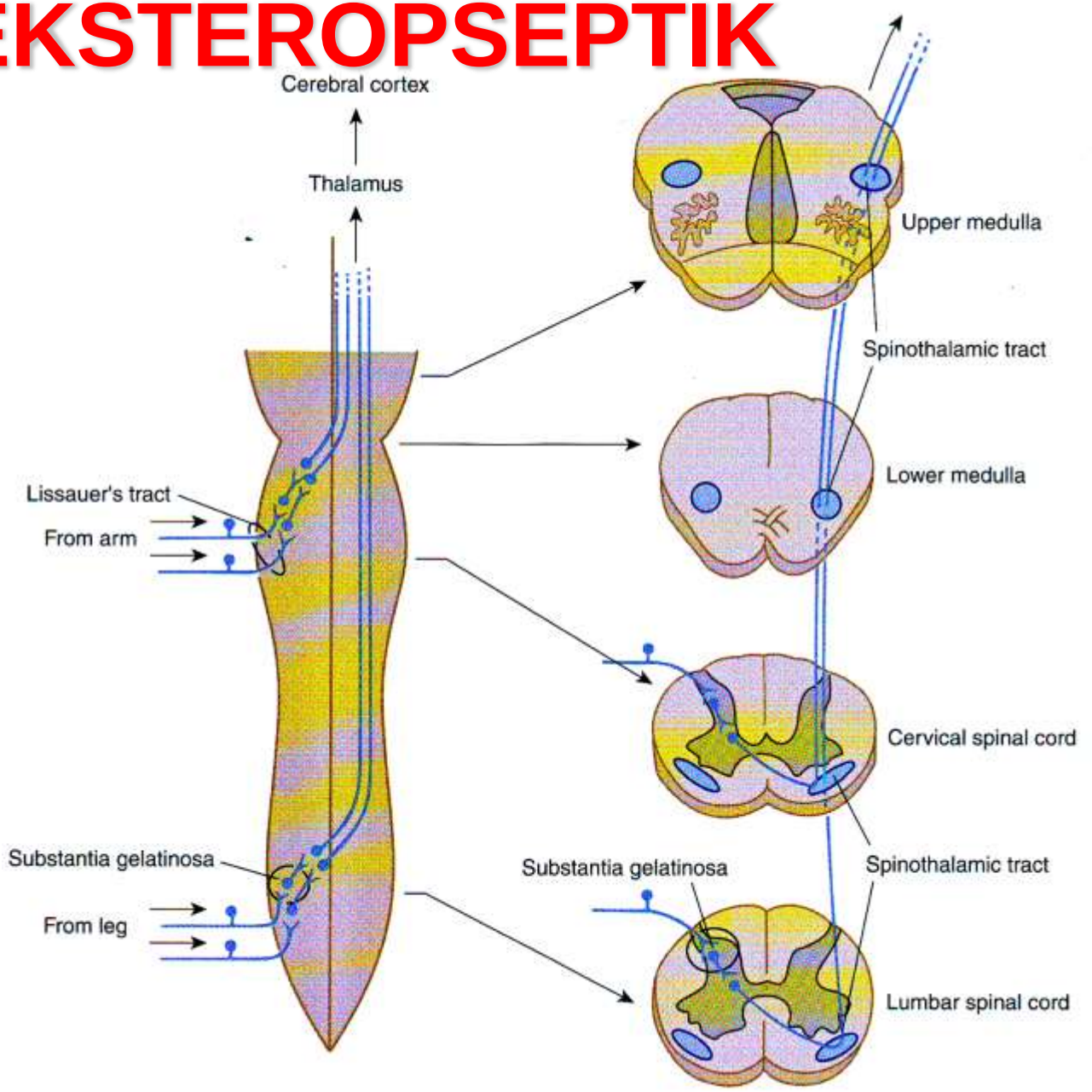
I. EKSTEROSEPTIK
II. PROPRIOSEPTIK
III. INTEROSEPTIK
IV. KORTIKAL SENSASI /SENSORIK LUHUR
V. SENSORIK KHUSUS (PANCA INDERA)

EKSTEROPSEPTIK

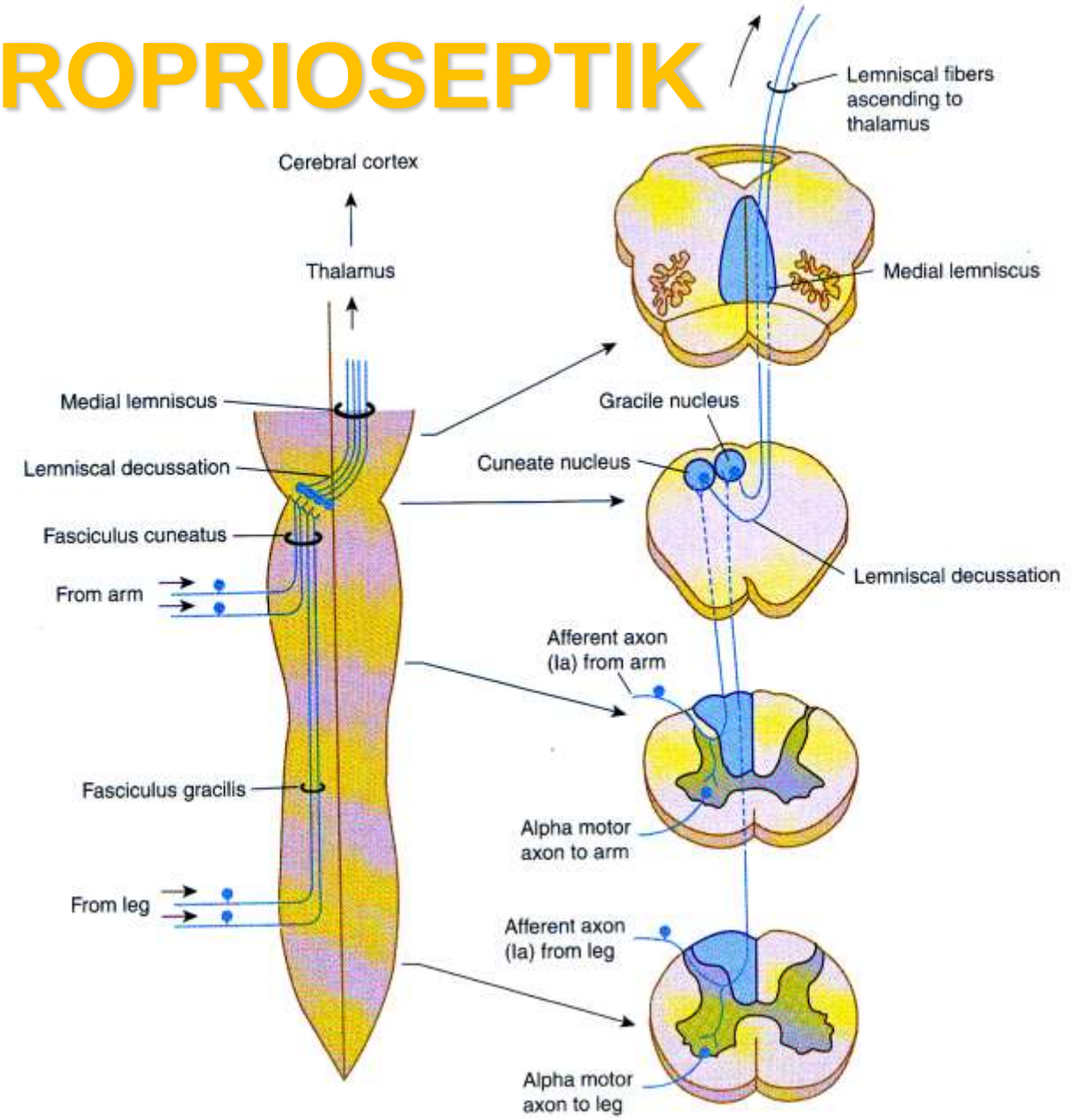
PROPRIOSEPTIK



EKSTEROPSEPTIK



PROPRIOSEPTIK

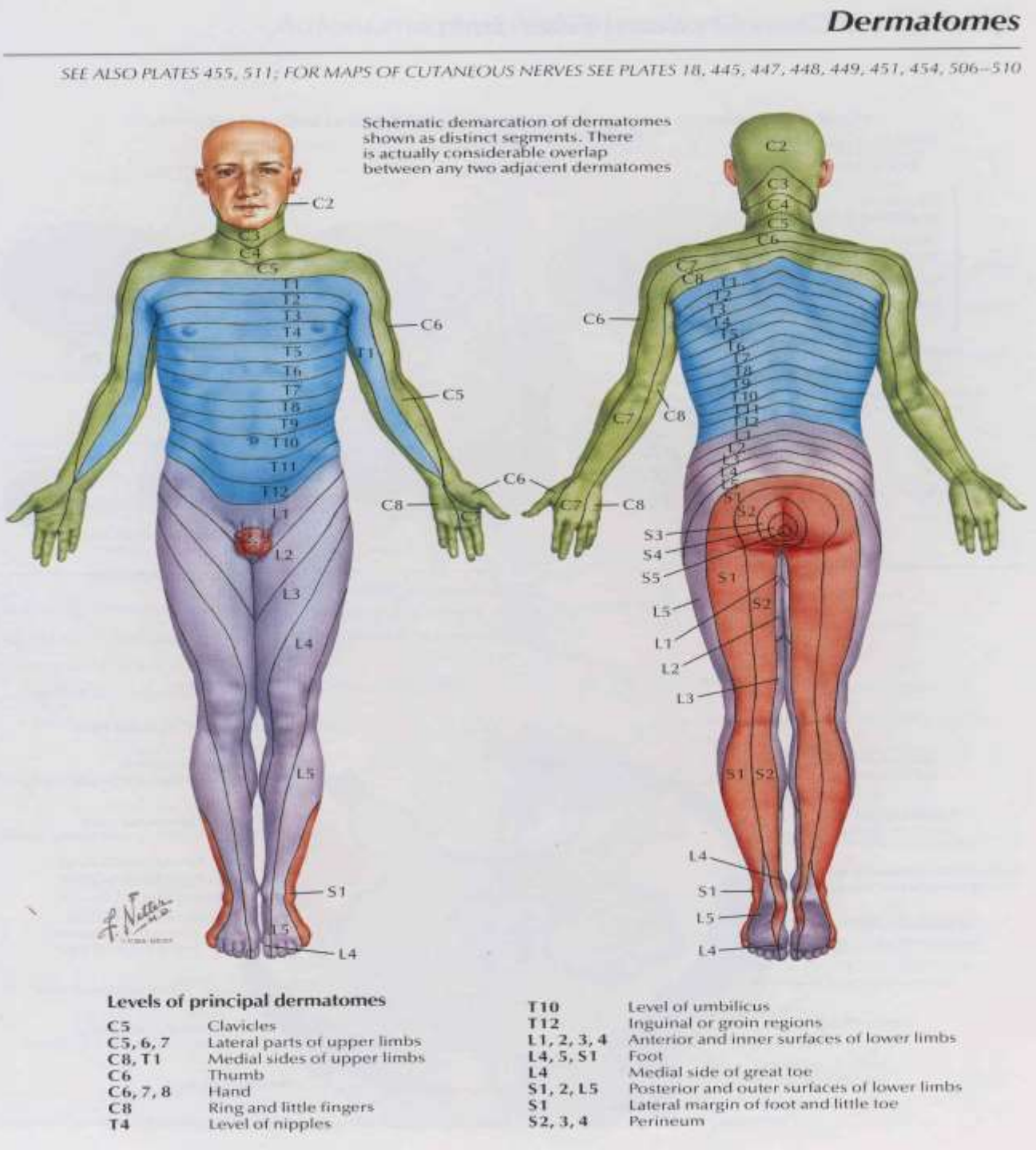


Sensasi superfisial atau eksteroseptif

1. Suhu
2. Raba
3. Nyeri

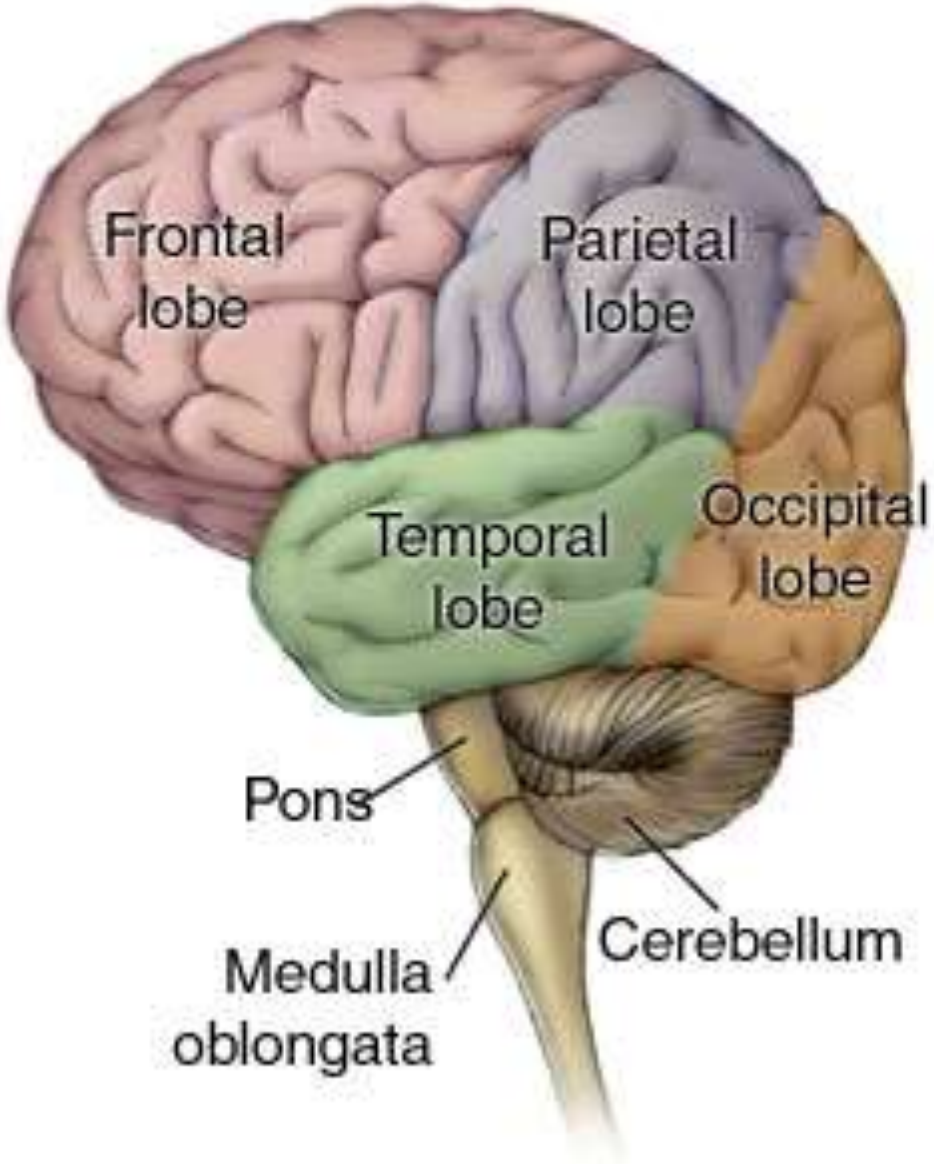
PROPRIOSEPTIK

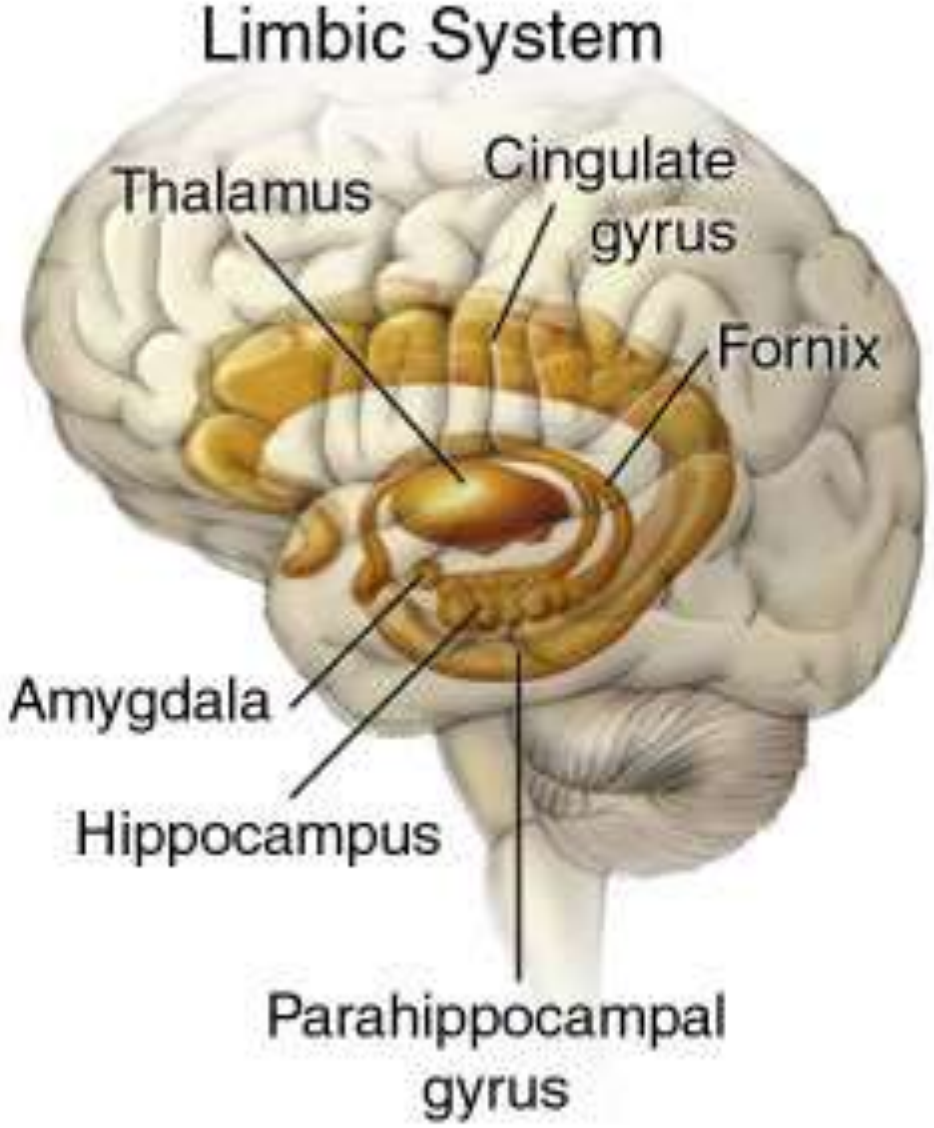
Posisi
Tekan dalam
Gerak

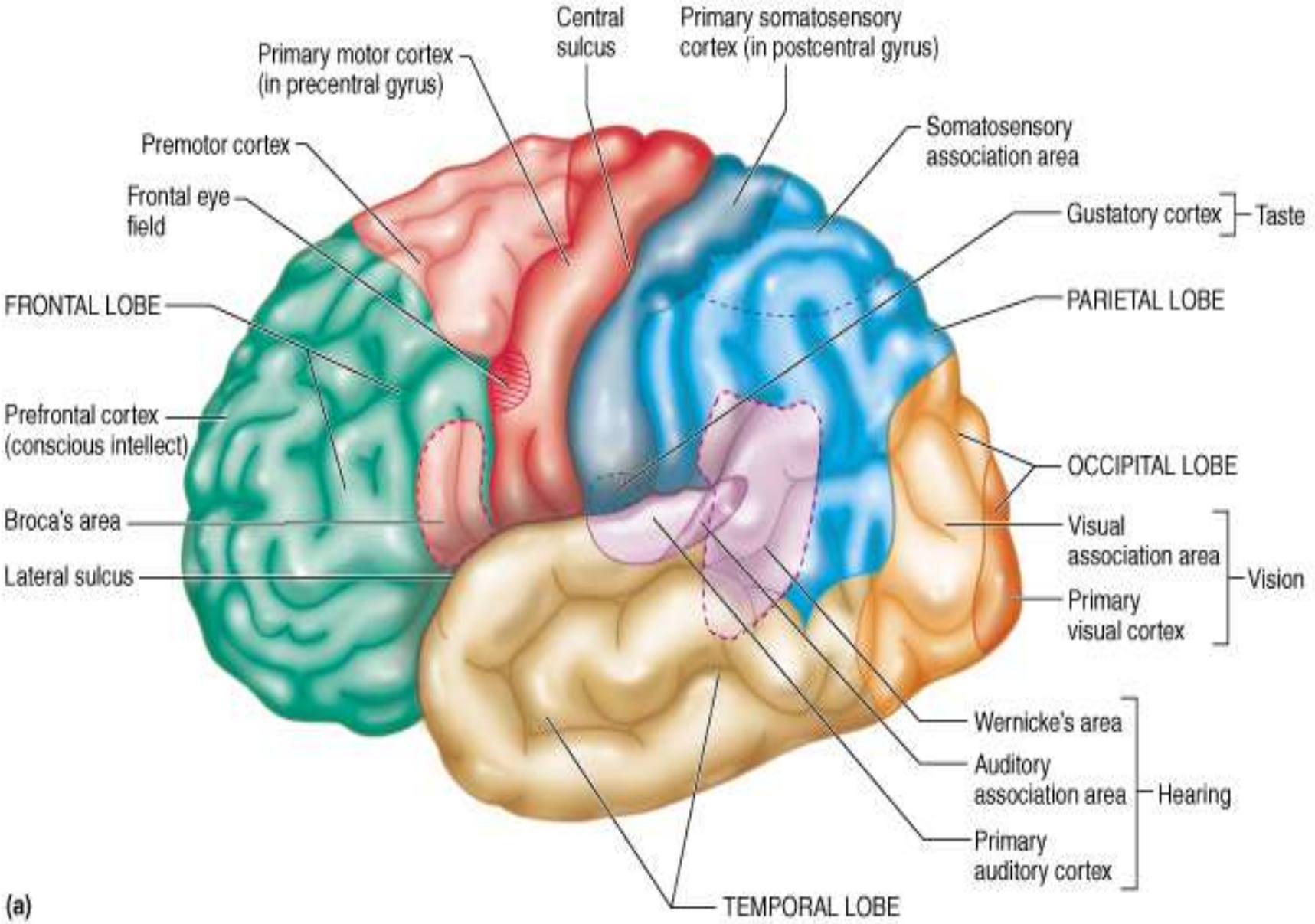


Anatomy of the Brain

KORTIKAL SENSASI







(a)

Area-area (kortikal) utama

1. Lobus frontalis

- Area 4 : (Girus presentralis): korteks motorik primer (utama)
- Area 6 : Area premotorik (lintasan motorik ekstrapiramidal).
- Area 8 : Berkaitan dengan gerakan mata konjugat dan perubahan pupil.
- Area 44, 45 : Area bahasa motorik (Broca)

2. Lobus parietalis

- Area 3,1 dan 2 : (girus postsentralis) atau area somatosensorik korteks sensorik primer (utama)

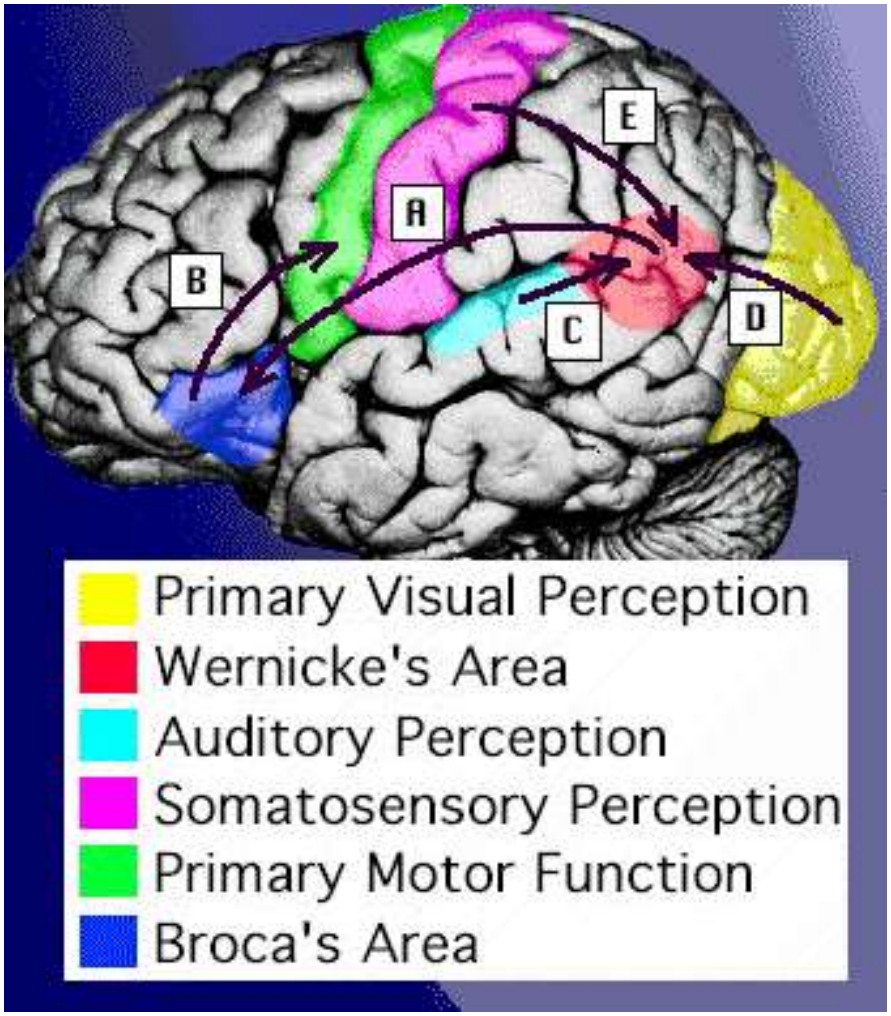
3. Lobus temporalis

- Area 41 : korteks auditorik (pendengaran)
- Area 42 : korteks auditorik sekunder (asosiasi).
- Area 22 :area bahasa perseptif (Wernicke).
- Area 28 : area olfaktorik (pembau)

4. Lobus oksipitalis

- Area 17 : (korteks striatum / fisura kalkarina) : korteks visual (penglihatan) primer.
- Area 18, 19 : korteks asosiasi visual.

Anatomi & Fisiologi



- **The major language centers of the brain.**

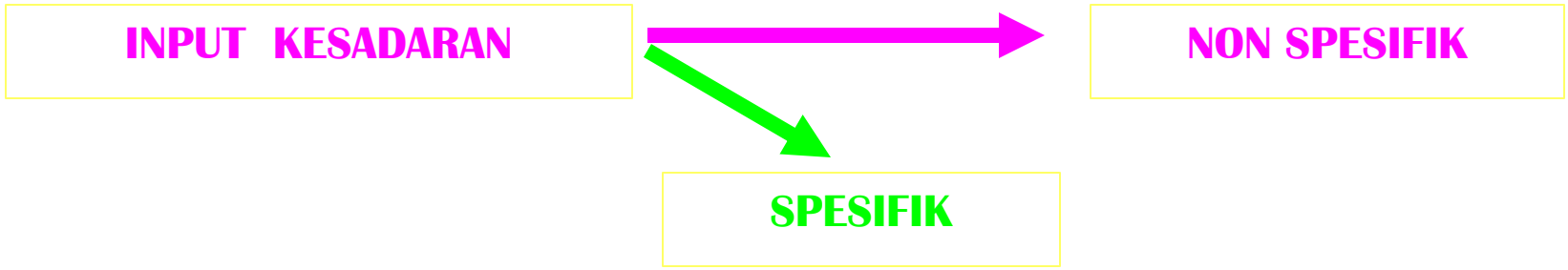
The motor and sensory areas are presented as landmarks. Interconnecting functional pathways are indicated by letters: A) The connection between Wernicke's and Broca's areas, mediating expression of language utterances in speech;

B) The connection between Broca's area and the primary motor area;

C) Connection between primary auditory perception and Wernicke's area;

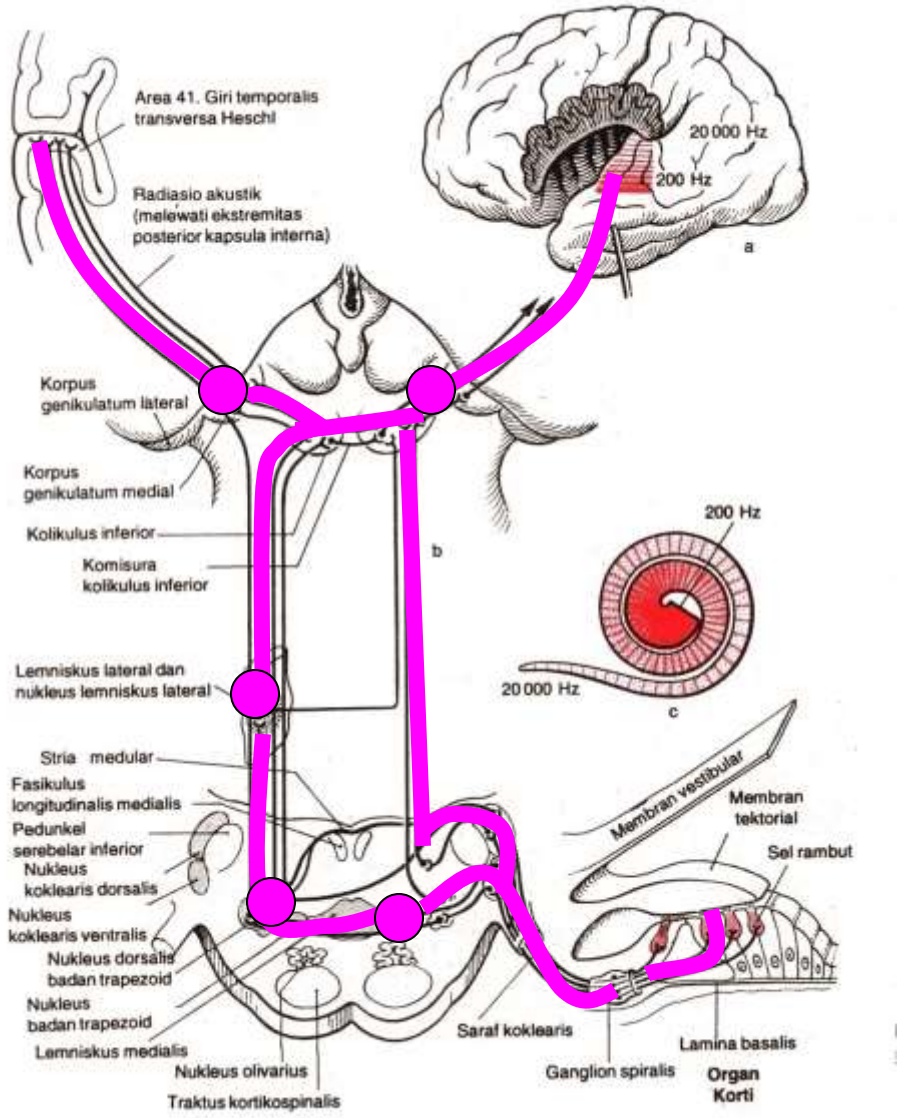
D) Connection between vision and Wernicke's area, mediating reading ability;

E) Connection between somatosensory perception (tactile, pain, cold/hot, position sense) and Wernicke's area, this would mediate language comprehension by tracing letters on the skin or reading braille.



5 INDERA	Jaras	Terminal	Radiasio	Kortek
Kulit	SpinoThalamik	Thalamus	Thal.Cortic	Area 123 Area 5 7
Mata	Tract. Opticus	C.Genic.Lat.	Rad.Optic	Area 17 Area 18 19
Telinga	Lemnic.Lat.	C.Genic.Med	Rad.Acustic	Area 41 Area 42 22
Hidung	N.Olfactorius	Bulb.Olfact.	Stria Olfact	Area 28 Area 35 25
Lidah	Lemnic.Medial	Thalamus	Rad.Gustat	Area 43 Area ? ?

PEMAHAMAN Auditory / Verbal / Oral



INPUT AUDITORY

SPESIFIK

Cohlea Labirin
Nn.VIII
Nuc.Nn.VIII
Lemnisc.Medialis

↓

Kortek Primer Area 41
Tahu / Know

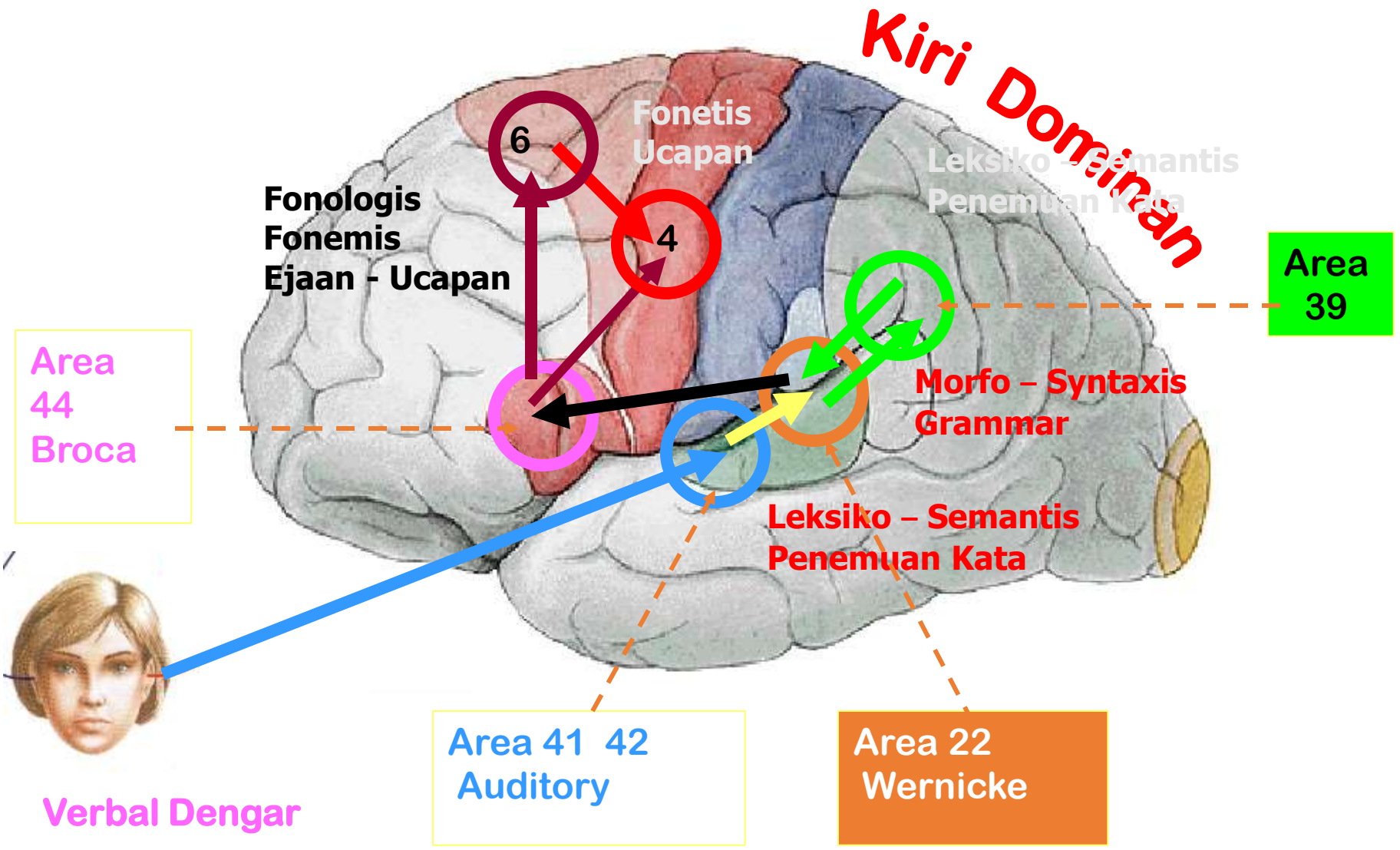
↓

Kortek Sekunder Area 42
Kenal / Synthesis

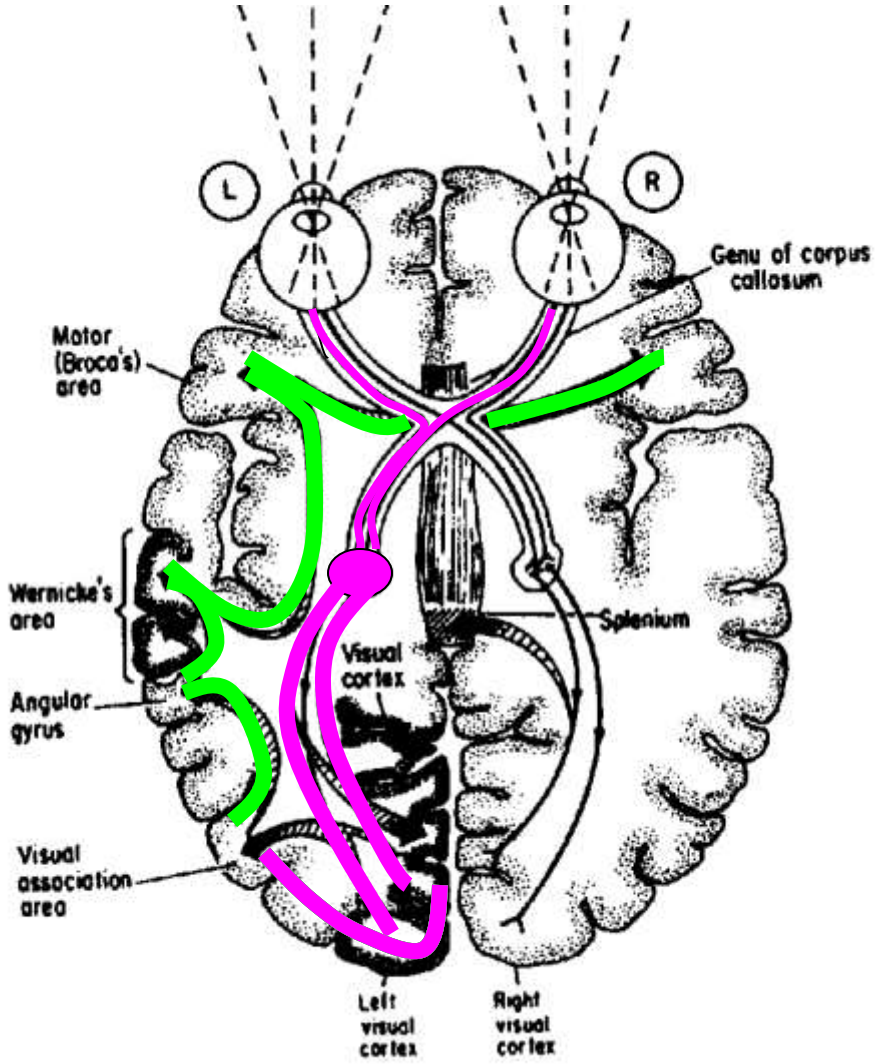
↓

Kortek Tertier Area 22
Faham / Analysis

PROSES BERBAHASA / KOMUNIKASI VERBAL



KESADARAN VISUAL



INPUT VISUAL

SPESIFIK

Retina
Tractus Opticus
Corpus Genic.Lateral
Radiatio Optica

⬇

Kortek Primer Area 17
Tahu / Know

⬇

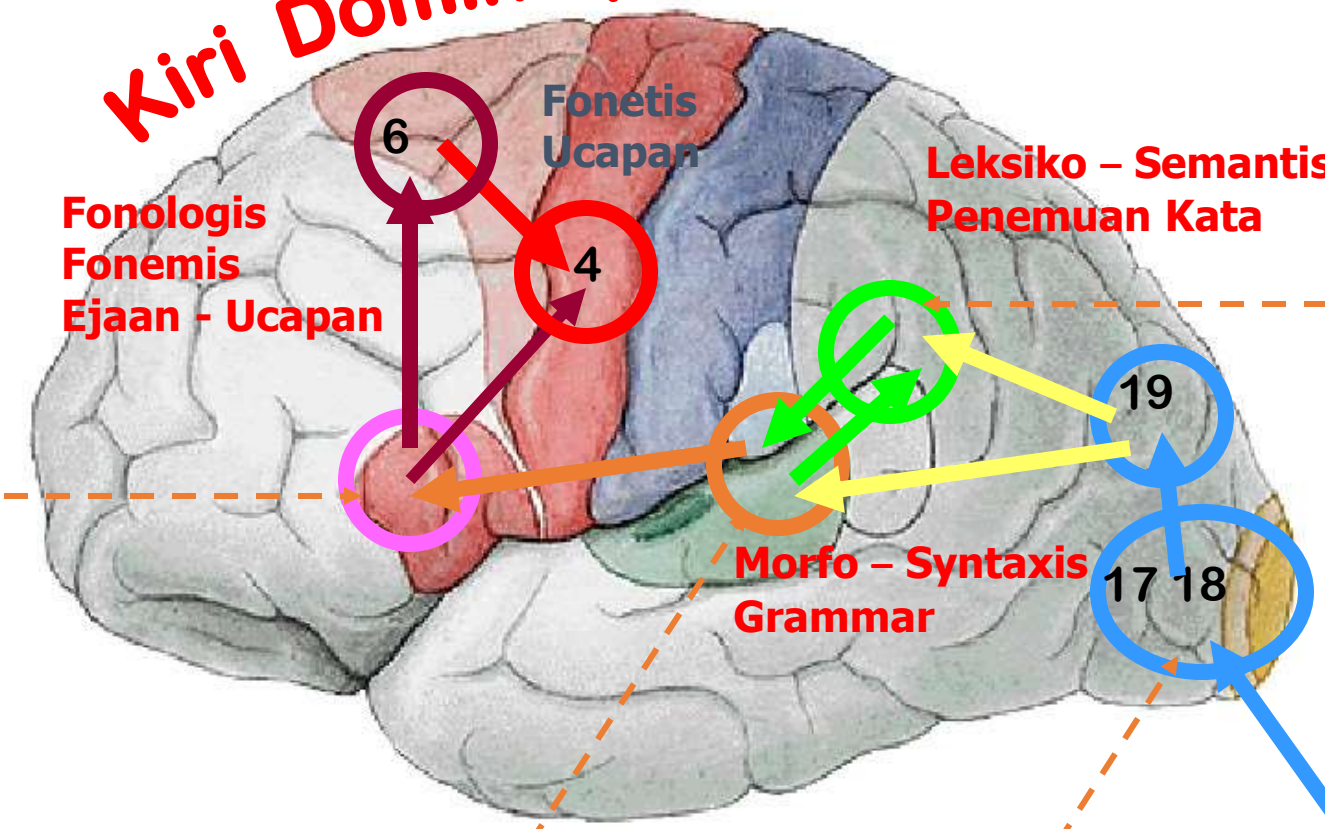
Kortek Sekunder Area 18
Kenal / Synthesis

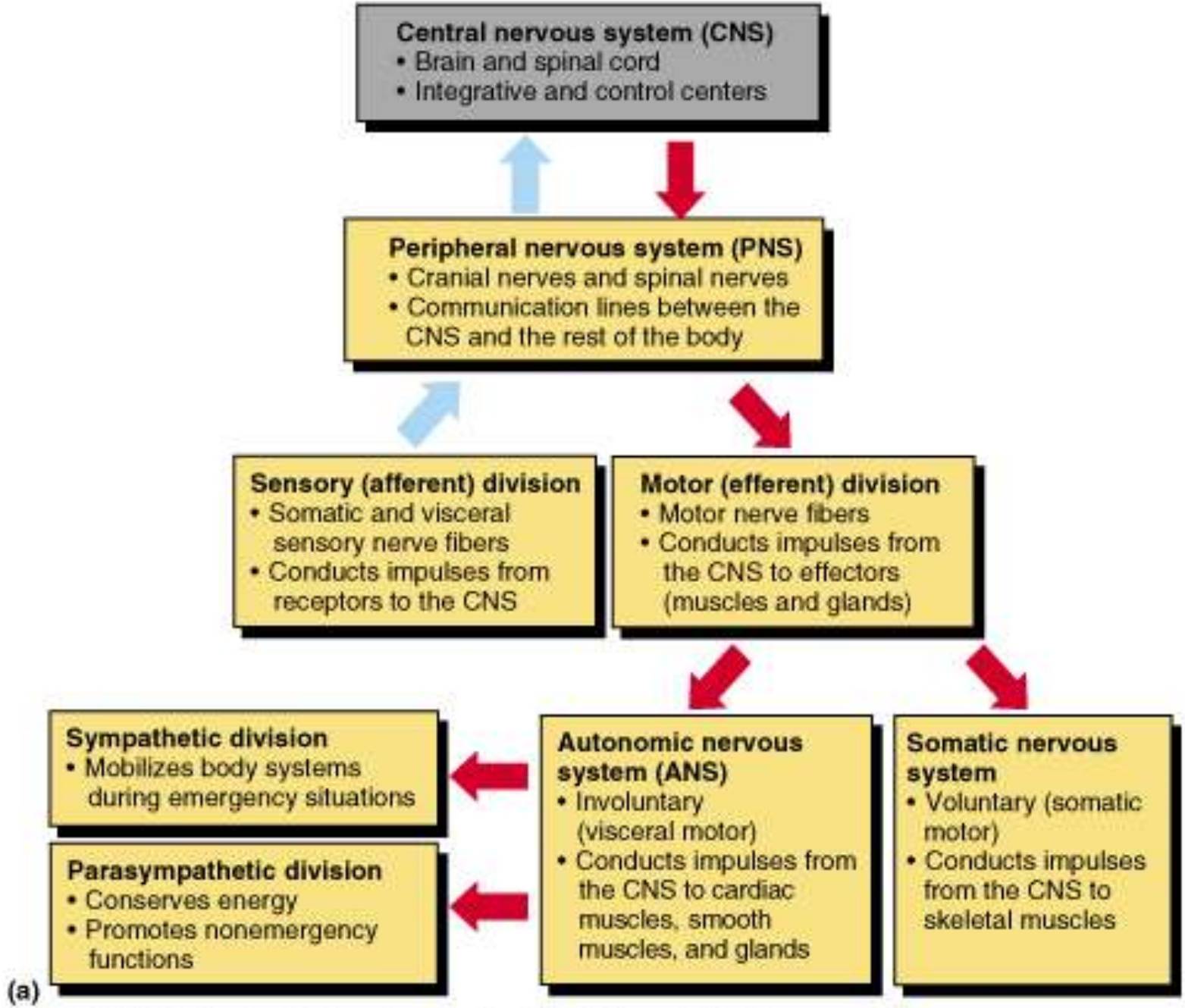
⬇

Kortek Tertier Area 19
Faham / Analysis

PROSES BERBAHASA / KOMUNIKASI

VISUAL = TULIS (Membaca)





(a)

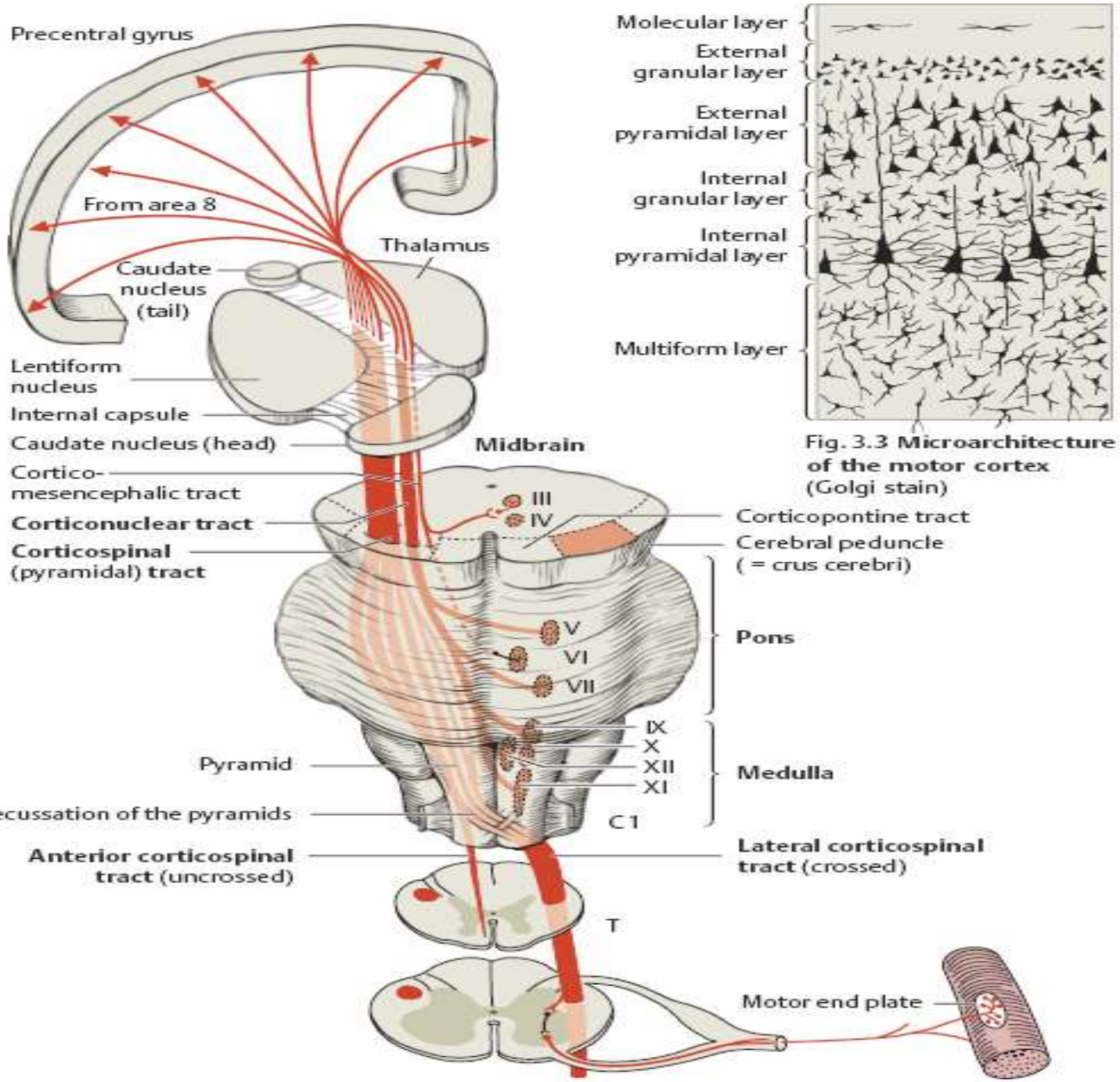
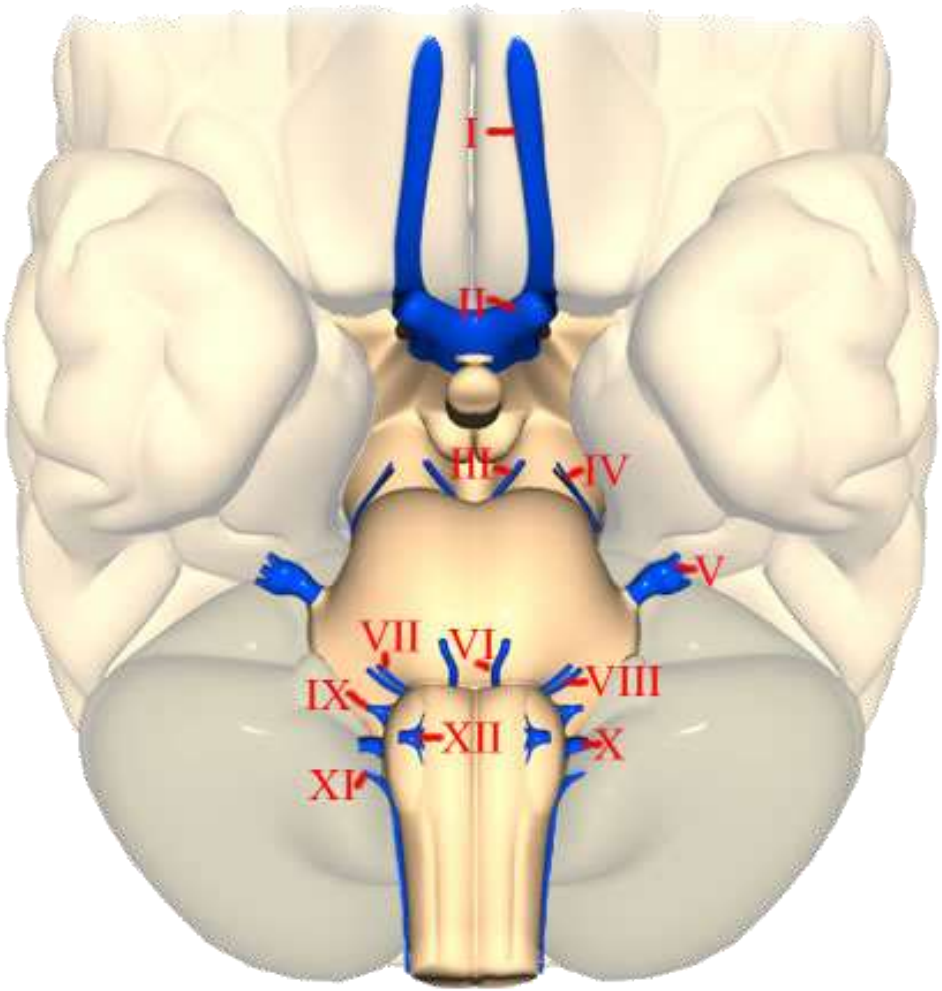


Fig. 3.3 **Microarchitecture of the motor cortex** (Golgi stain)

Fig. 3.4 **Course of the pyramidal tract**

Sensorik khusus

I. **Olfactory nerve**
II. **Optic nerve**
III. Oculomotor nerve
IV. Trochlear nerve
V. Trigeminal nerve
VI. Abducens nerve
VII. Facial nerve
VIII. **Vestibulocochlear nerve**
IX. **Glossopharyngeal nerve**
X. Vagus nerve
XI. Accessory nerve
XII. Hypoglossal nerve



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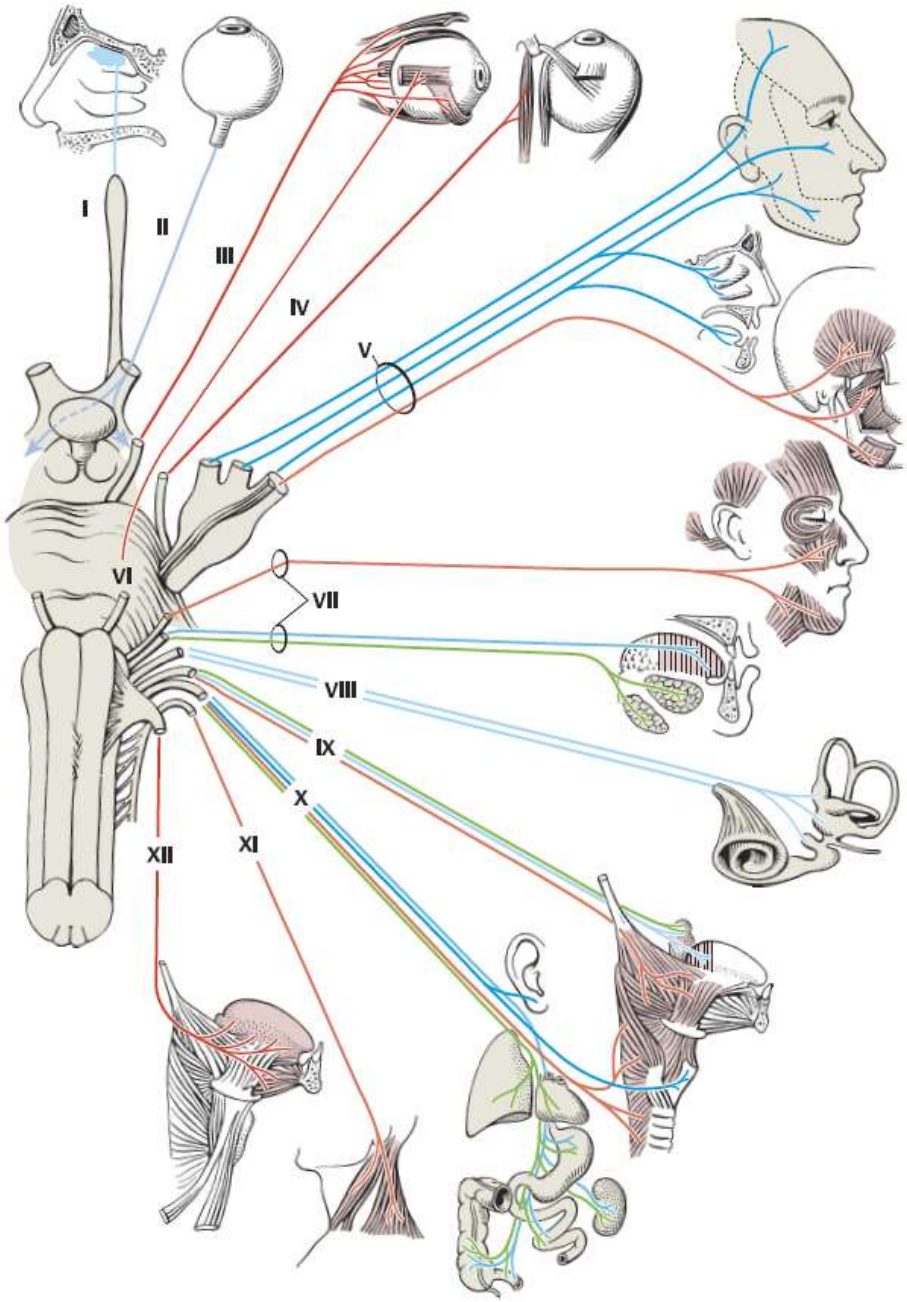


Fig. 4.5 **Cranial nerves: sites of exit from the brainstem, components, and distribution**

Cranial Nerves

I Olfactory--------Sensory--smell

II Optic----------Sensory--vision

III Oculomotor----Motor----extrinsic eye muscles

IV Trochlear-------Motor----extrinsic eye muscles

V Trigeminal

V_1 Opthalmic-----Sensory-cornea, nasal mucosa, face skin

V_2 Maxillary------Sensory-skin of face, oral cavity, teeth

V_3 Mandibular---Motor-muscles of mastication

---Sensory-face skin, teeth, tongue (general)

Cranial Nerves (continued)

VI Abducens----------Motor-----eye abduction muscles

VII Facial----------Sensory---part of tongue (taste)

----------Motor------muscles of facial expression

VIII Vestibulocochlear---Sensory----hearing, equilibrium

IX Glossopharyngeal----Motor------stylopharyngeus muscle

----Sensory----tongue (gen & taste), pharynx

X Vagus----------Motor-------pharynx, larynx

----------Sensory----pharynx, larynx, abd. organs

XI Accessory----------Motor------trapezius, sternocleidomastoid

XII Hypoglossal----------Motor-------tongue muscles

- **SARAF I (OLFAKTORIUS)** DAN **II (OPTIKUS)**
  → Jaras-jaras yang berupa tonjolan otak.

- **SARAF XI (ASESORIUS)**
  → Segmen servikal atas medula spinalis.

- **SARAF-SARAF KRANIAL (III-X DAN XII)**
  → berinti padaBatang Otak.

Saraf	Komponen	Asal	Fungsi
I	VAK	Neuron olfaktorik bipolar pada mukosa olfaktorius	Pembauan (penghidu)
II	SAK	Lapisan sel ganglioner (retina)	Penglihatan
III	SA	Nukleus okulomotorius (mesensefalon)	Mm rektus superior, inferior, medialis; M oblikuus inferior; M levator palpebrae
	VE (para-simpatik)	Nuklei Edinger Westphal	M sfingter pupilae, M siliaris
	SA	Proprioseptor otot-otot bola mata	Proprioseptik
IV	SE	Nukleus trokhlearis (mesensefalon)	M oblikuus superior
	SA	Proprioseptor	Proprioseptik
V	SA	Sel-sel bipolar (ganglion semilunare)	Sensibilitas kulit wajah, mukosa hidung dan mulut
Arkus brankhialis I	BE	Inti motorik n. V	Otot-otot pengunyah
	SA	Proprioseptor otot-otot penguyah	Proprioseptik
VI	SE	Nukleus abdusens	M rektus lateralis
	SA	Proprioseptor	Proprioseptik
VII	BE	Nukleus fasialis	Otot-otot mimik, plastisma, M stilohioid, M digastrikus

BE : brankhio-eferen
SA : somato-aferen
SAK : somato-aferen khusus
SE : somato-eferen
VA : visero-aferen
VAK : visero-aferen khusus
VE : visero-eferen

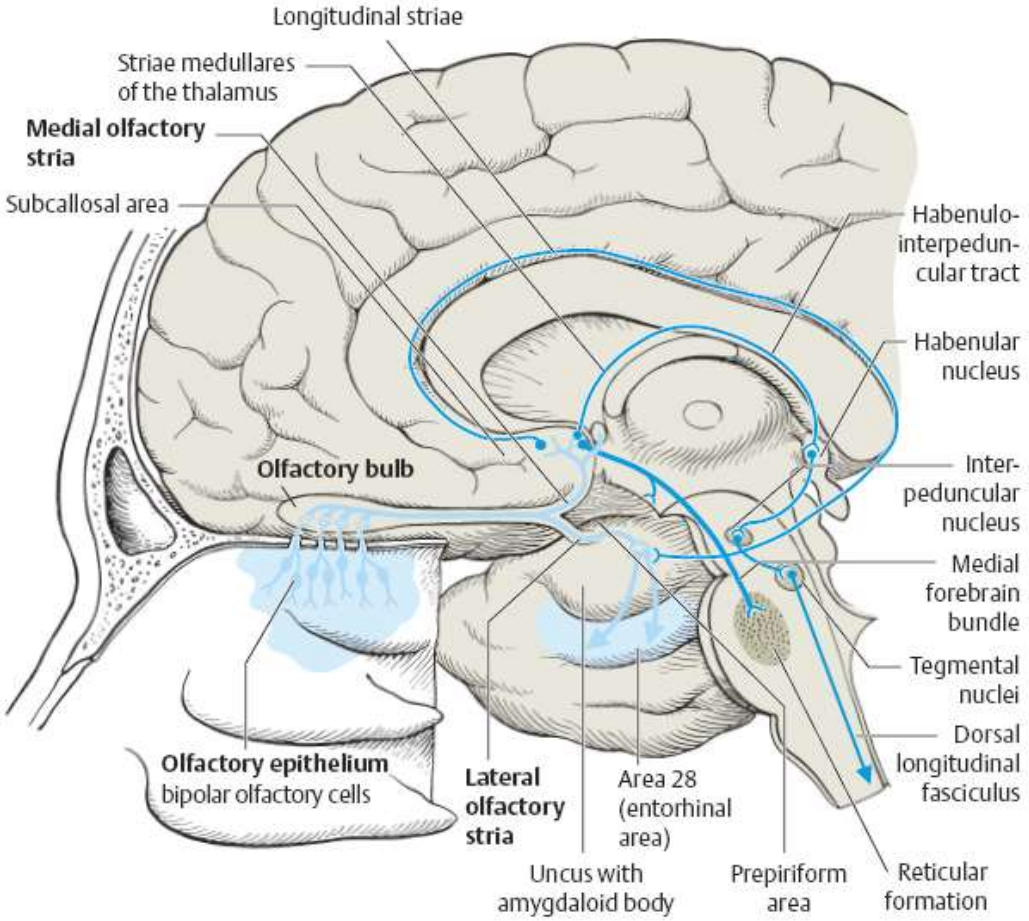
Saraf	Komponen	Asal	Fungsi
Arkus brankhialis II	VE	Nukleus salivatorius superior	Kelenjar-kelenjar hidung lakrimalis, ludah (sublingualis dan submandibularis)
N. intermedius	VAK	Ganglion genikuli	Pengecapan 2/3 depan lidah
	SA	Ganglion genikuli	Sensibilitas: telinga bagian luar, sebagian kanalis auditorius, permukaan luar membran timpani
VIII	SAK	Ganglion vestibularis	Keseimbangan, kristae kanalis semilunaris, makula utrikuli dan sakuli
		Ganglion spirale	Pendengaran, organon Corti
IX	BE	Nukleus ambiguus	M stilofaringeus, otot faring
	VE (para-simpatik)	Nukleus salivatorius inferior	Salivasi, kelenjar parotis
Arkus brankhialis III	VAK	Ganglion inferius	Pengecapan 1/3 belakang lidah
	VA	Ganglion superius	Sensibilitas: 1/3 belakang lidah dan faring (refleks muntah)
	SA	Ganglion superius	Sensibilitas: telinga tengah, tuba Eustachii

BE : brankhio-eferen
SA : somato-aferen
SAK : somato-aferen khusus
SE : somato-eferen
VA : visero-aferen
VAK : visero-aferen khusus
VE : visero-eferen

Saraf	Komponen	Asal	Fungsi
X	BE	Nukleus ambiguus	Otot-otot faring dan laring
	VE (para-simpatik)	Nukleus dorsalis N. vagus	Motorik: visera rongga dada dan perut
Arkus brankhialis IV	VA	Ganglion inferius (nodosum)	Sensibilitas rongga perut
	VAK	Ganglion inferius (nodosum)	Pengecapan, epiglotis
	SA	Ganglion superius (jugulare)	Sensibilitas: kanalis auditorius, dura
XI	BE	Nukleus ambiguus (radiks kranialis)	Otot-otot faring dan laring
	SE	Sel-sel kornu anterior (radiks spinalis)	M. sternokleidomastoid-eus, M. trapesius
XII	SE	Nukleus hipoglosus	Otot-otot lidah

BE : brankhio-eferen
SA : somato-aferen
SAK : somato-aferen khusus
SE : somato-eferen
VA : visero-aferen
VAK : visero-aferen khusus
VE : visero-eferen

Nervus Olfaktorius : saraf penghidu

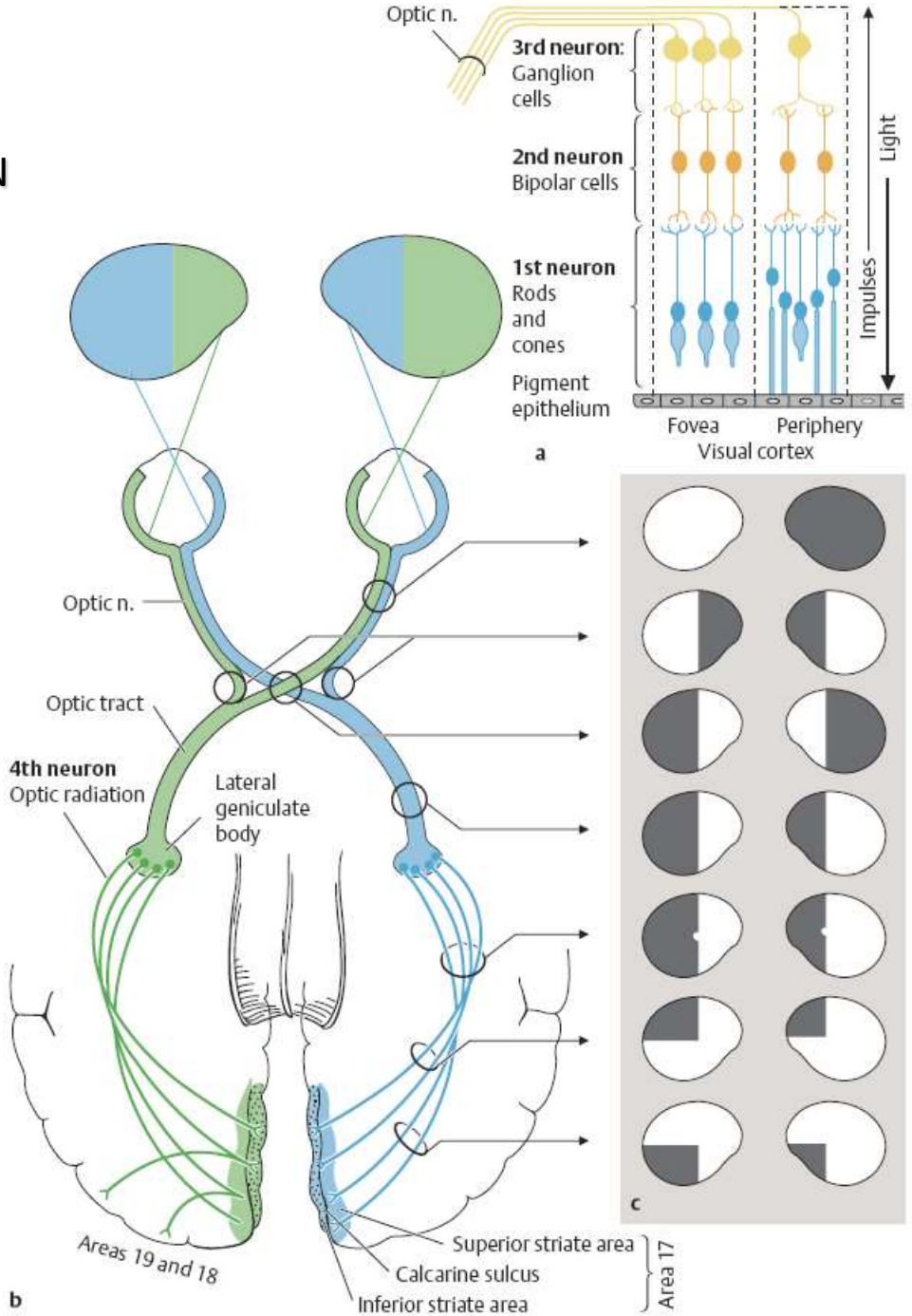


- Reseptor → N.I → bulbus olfaktorius → trig. olf. → traktus olf. → - korteks pyriformis
  (unkus / insula)
  - korteks ass.
  (girus hipokampus)

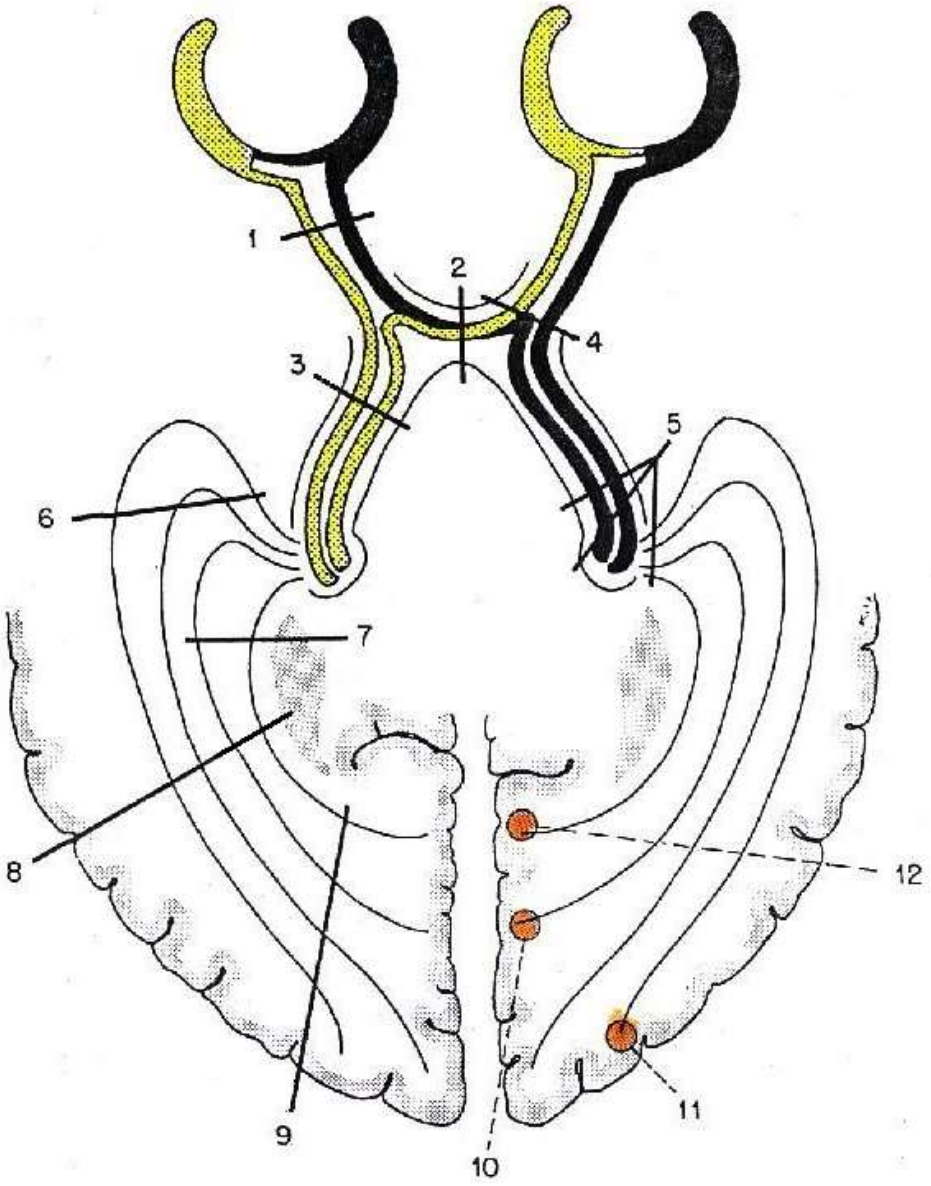
NERVUS OPTIKUS

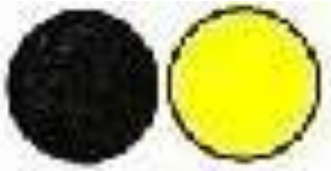
BERFUNGSI UNTUK PENGLIHATAN

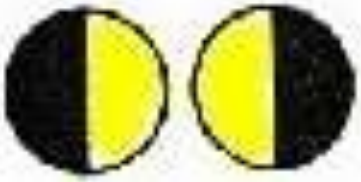
Impuls cahaya retina
ser.af.pap.N.II N.II
for.opt. chiasma opt.
 trak.opt.
korp.gen.lat. Tr.GC
korteks ocipitalis



Gangg. Visual Field :



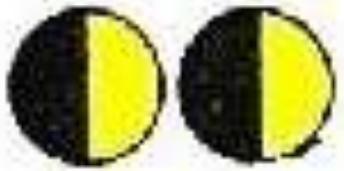
1  buta total

2  hemianopsia bitemporal

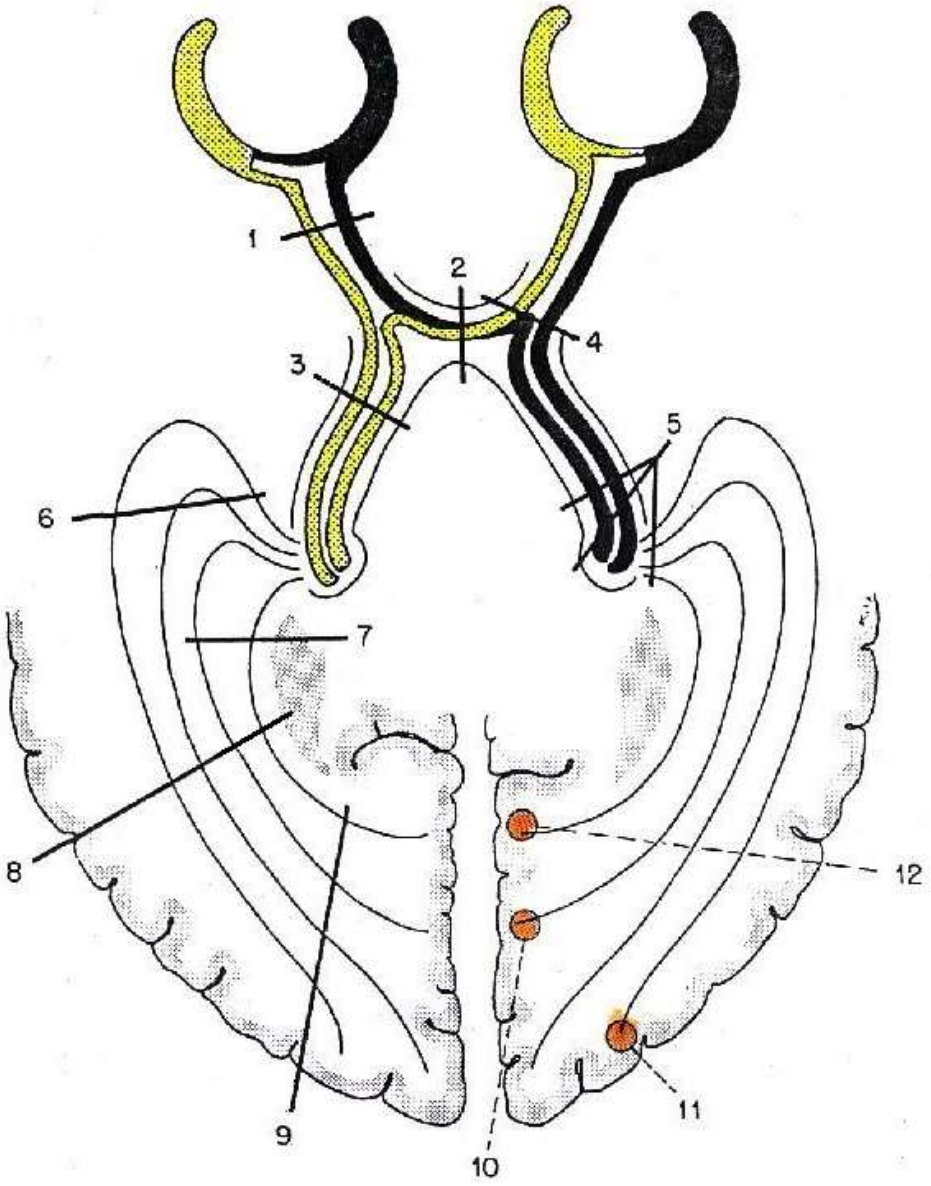
3 

- hemianopsia homonim S

4 

5 

Gangg. Visual Field :

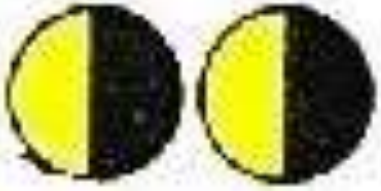


6

Quadran anopsia

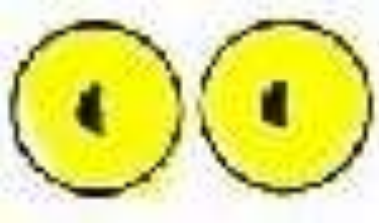
7

8

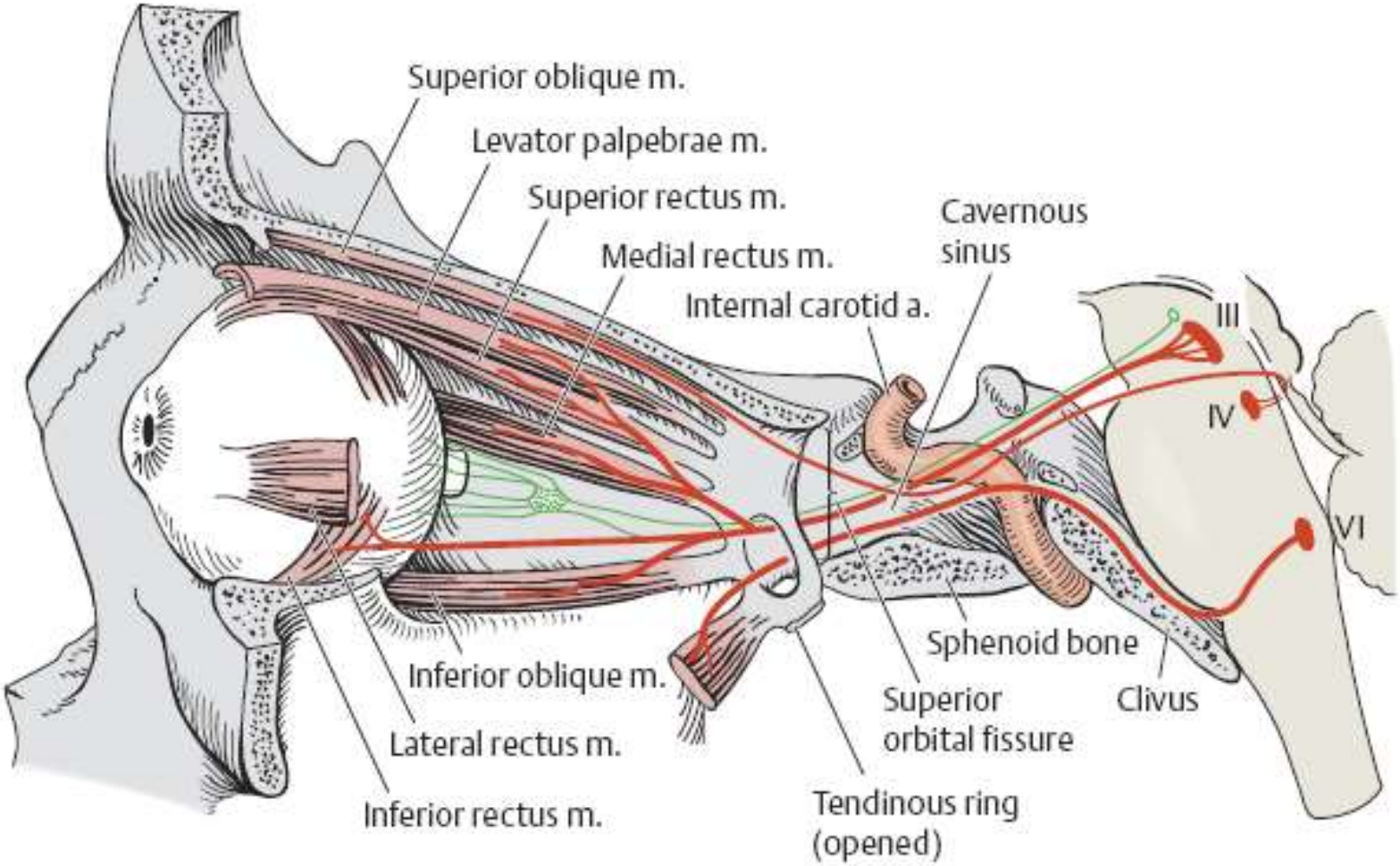


9

11



Nervus Okulomotorius (III)
Nervus Trokhlearis (IV)
Nervus Abducens (VI)



Nervus Okulomotorius (III)
Nervus Trokhlearis (IV)
Nervus Abducens (VI)

N. III : Kol.sup. : ~ Serabut motorik

↓ ~ serabut parasimpatik

sinus kafernosus fis.orb. sup.otot-

ekstrabulbar : moi,mrs,mrm,

mri.

N.IV : Kol.inf : ~ serabut motorik

↓

sinus kafernosus fis.orb.sup m.obl.sup

N.VI : Pons : ~ serabut motorik

↓

sinus kafernosus fis.orb.sup m.rect.lat

Fisiologis gerakan bola mata :

- Konyugat & konvergensi

Pem. N.III, IV, VI :

- Gerakan bola mata :

strab.paralitikus :

~ divergens

~ konvergens

- Celah mata normal simetris :

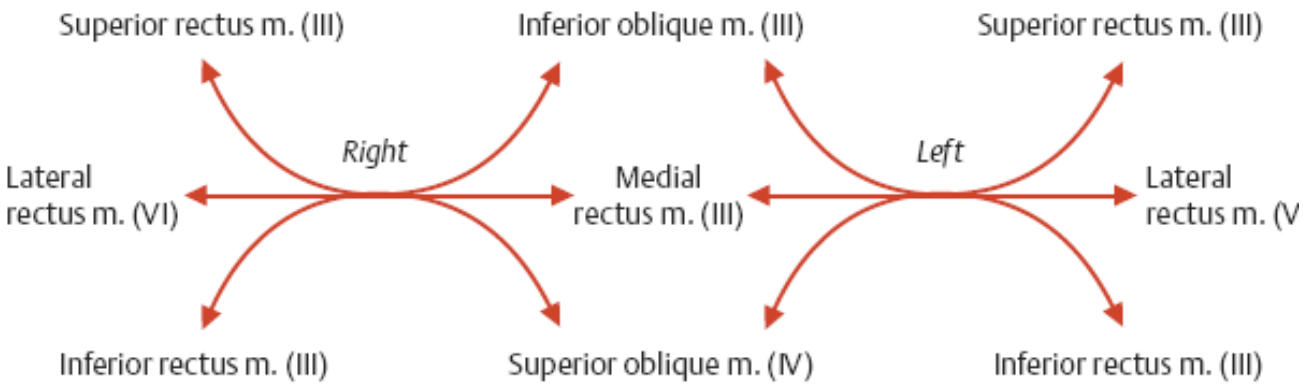
ptosis miastenia & horner s'

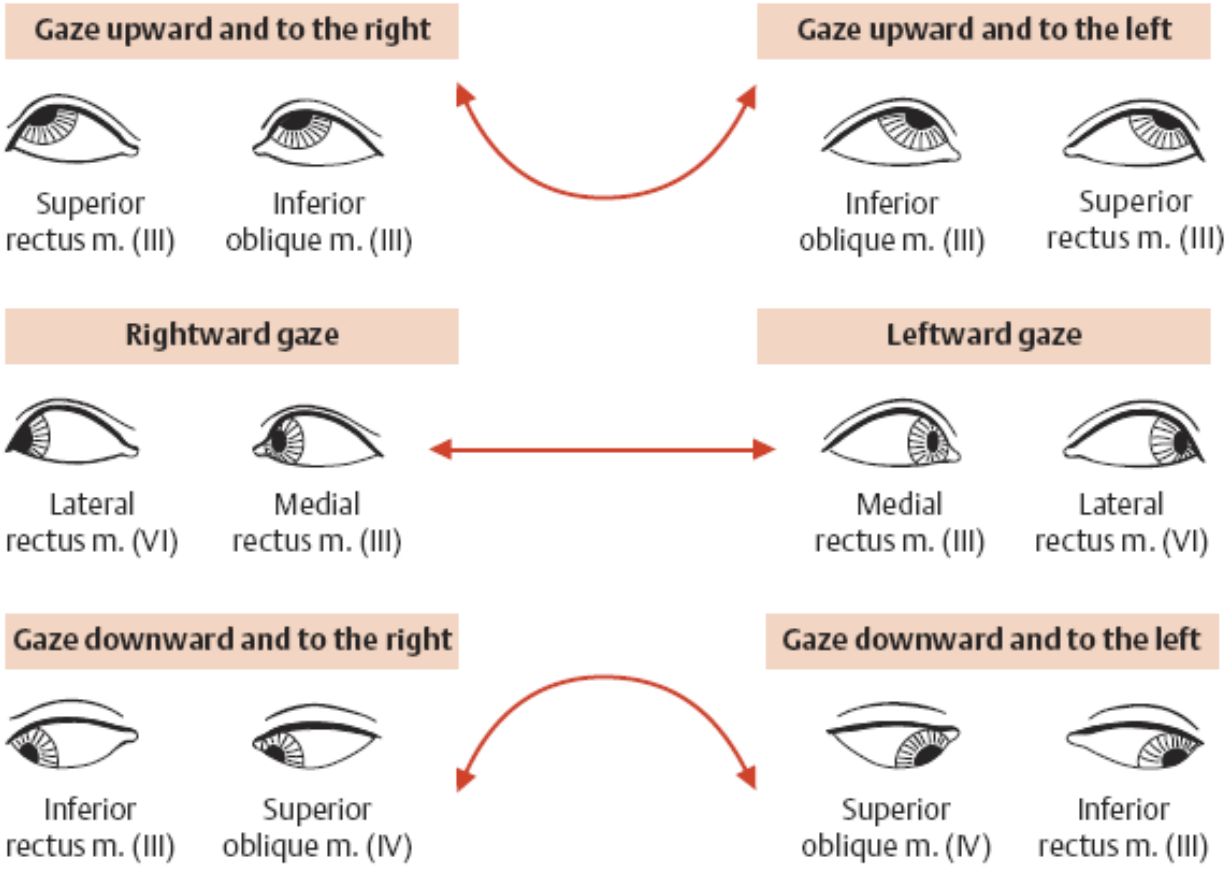
- Pem. Pupil : normal Ø 3 – 4 mm.

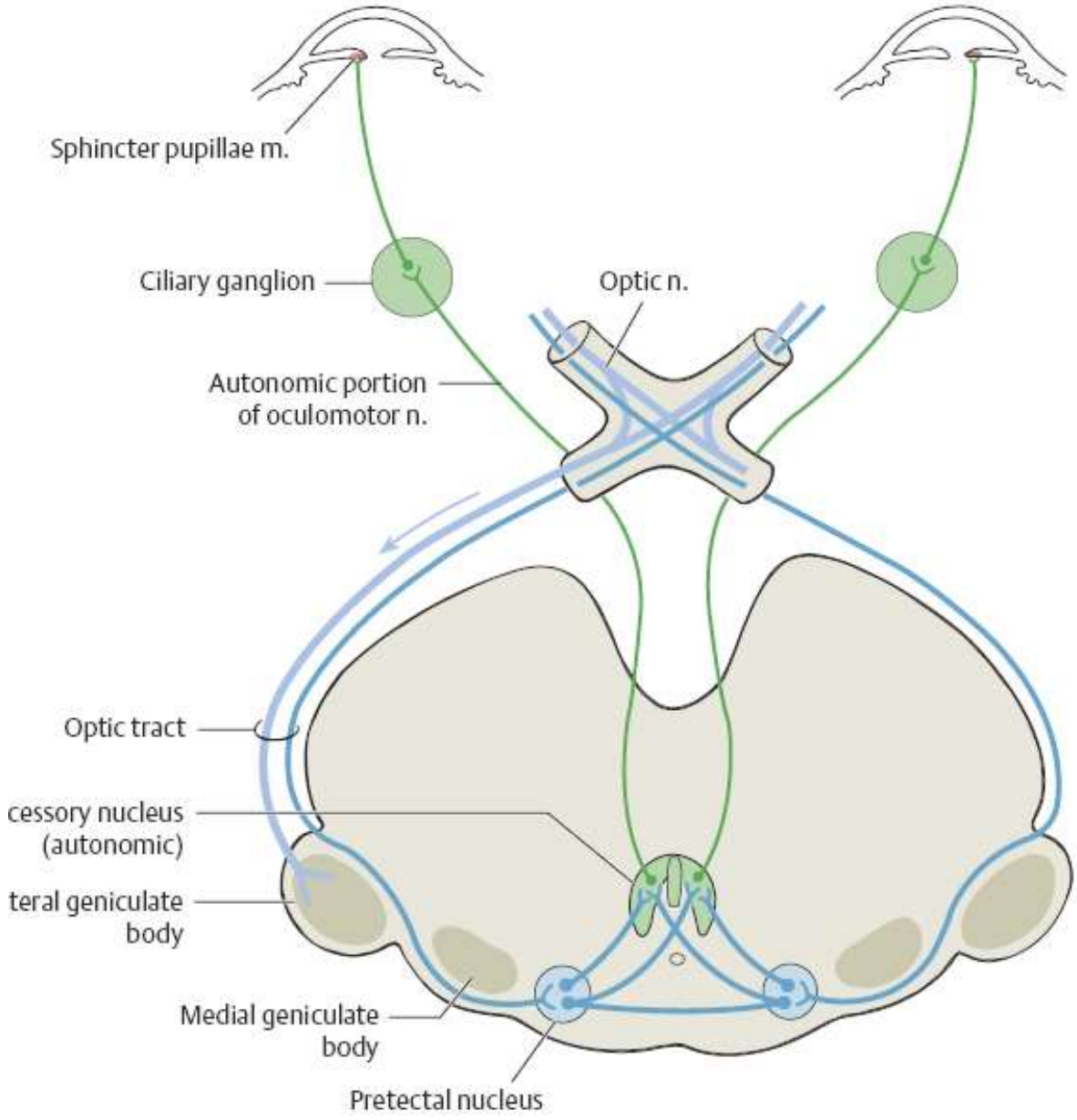
miosis – midriasis

refleks cahaya langsung / tdk langsung

refleks akomodasi

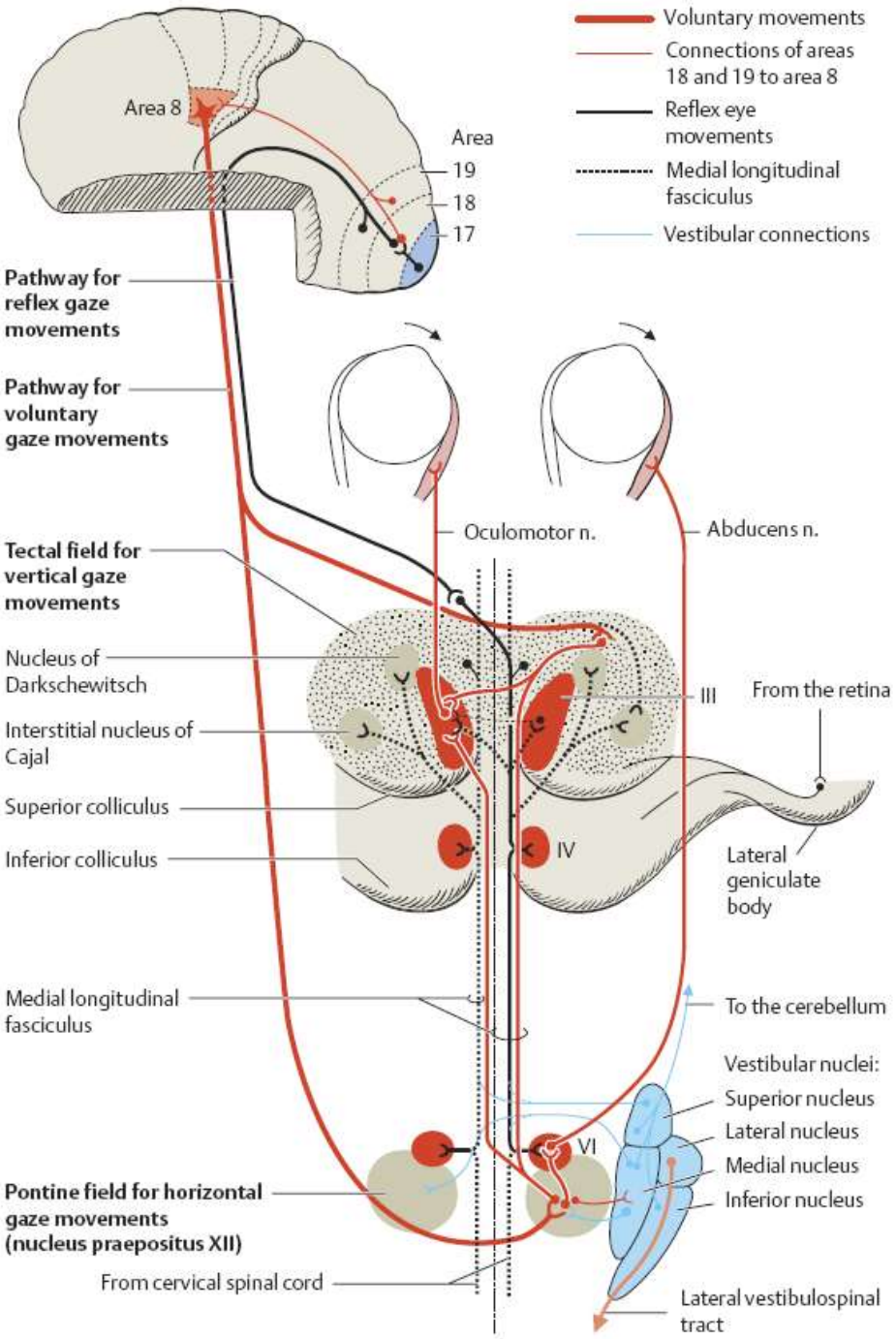

Superior rectus m. (III)
Inferior oblique m. (III)
Superior rectus m. (III)
Right
Left
Lateral rectus m. (VI)
Medial rectus m. (III)
Lateral rectus m. (V
Inferior rectus m. (III)
Superior oblique m. (IV)
Inferior rectus m. (III)


Gaze upward and to the right
Gaze upward and to the left
Superior rectus m. (III)
Inferior oblique m. (III)
Inferior oblique m. (III)
Superior rectus m. (III)
Rightward gaze
Leftward gaze
Lateral rectus m. (VI)
Medial rectus m. (III)
Medial rectus m. (III)
Lateral rectus m. (VI)
Gaze downward and to the right
Gaze downward and to the left
Inferior rectus m. (III)
Superior oblique m. (IV)
Superior oblique m. (IV)
Inferior rectus m. (III)



LINTASAN REFLLEK PUPIL

LINTASAN GERAK MATA KONJUGAT



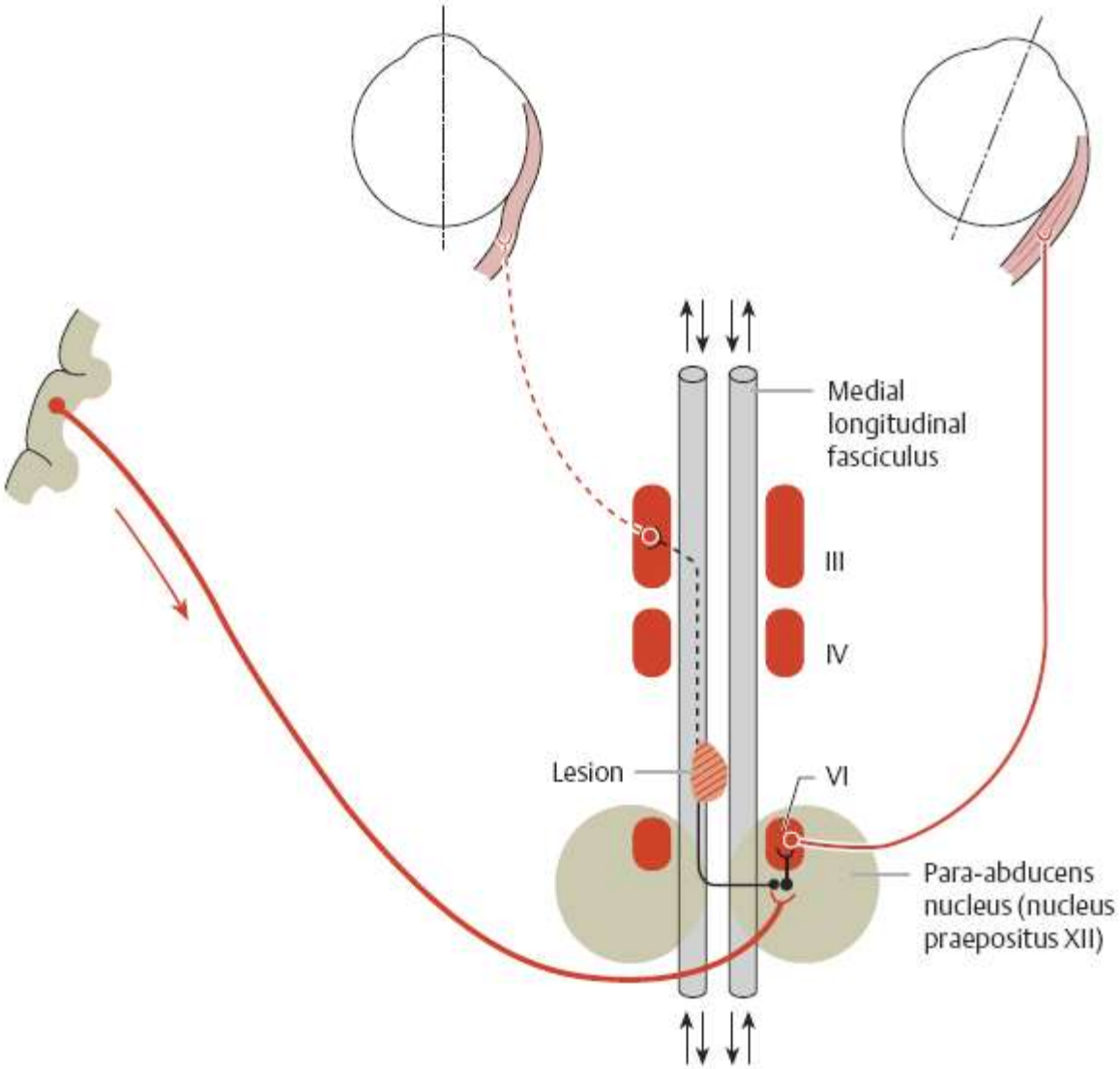


Fig. 4.22 **Internuclear ophthalmoplegia** due to a lesion of the medial longitudinal fasciculus

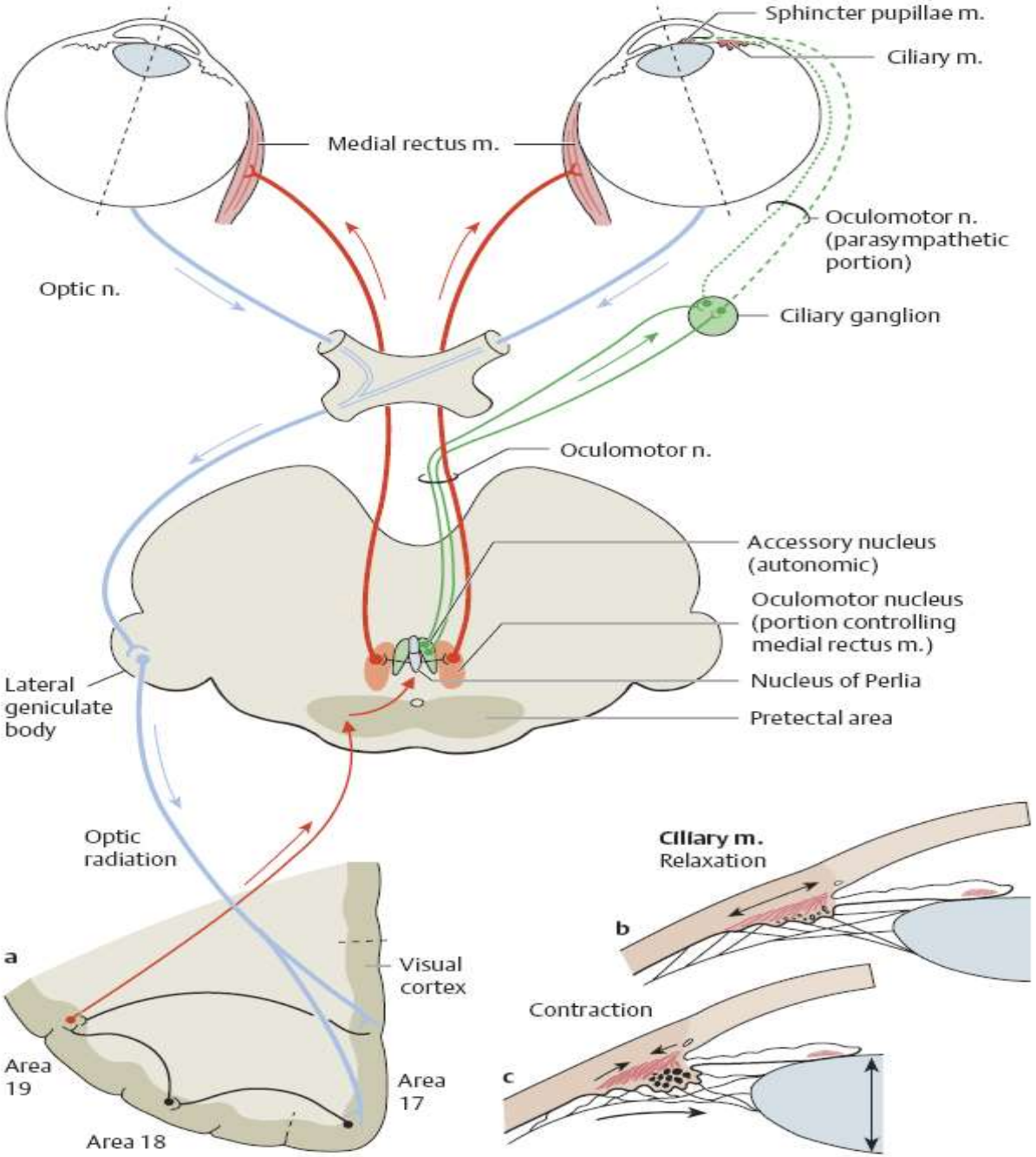


Fig. 4.25 **a The anatomical basis of convergence and accommodation**. **b** The ciliary muscle in relaxation (vision at a distance). **c** The ciliary muscle in contraction (near vision).

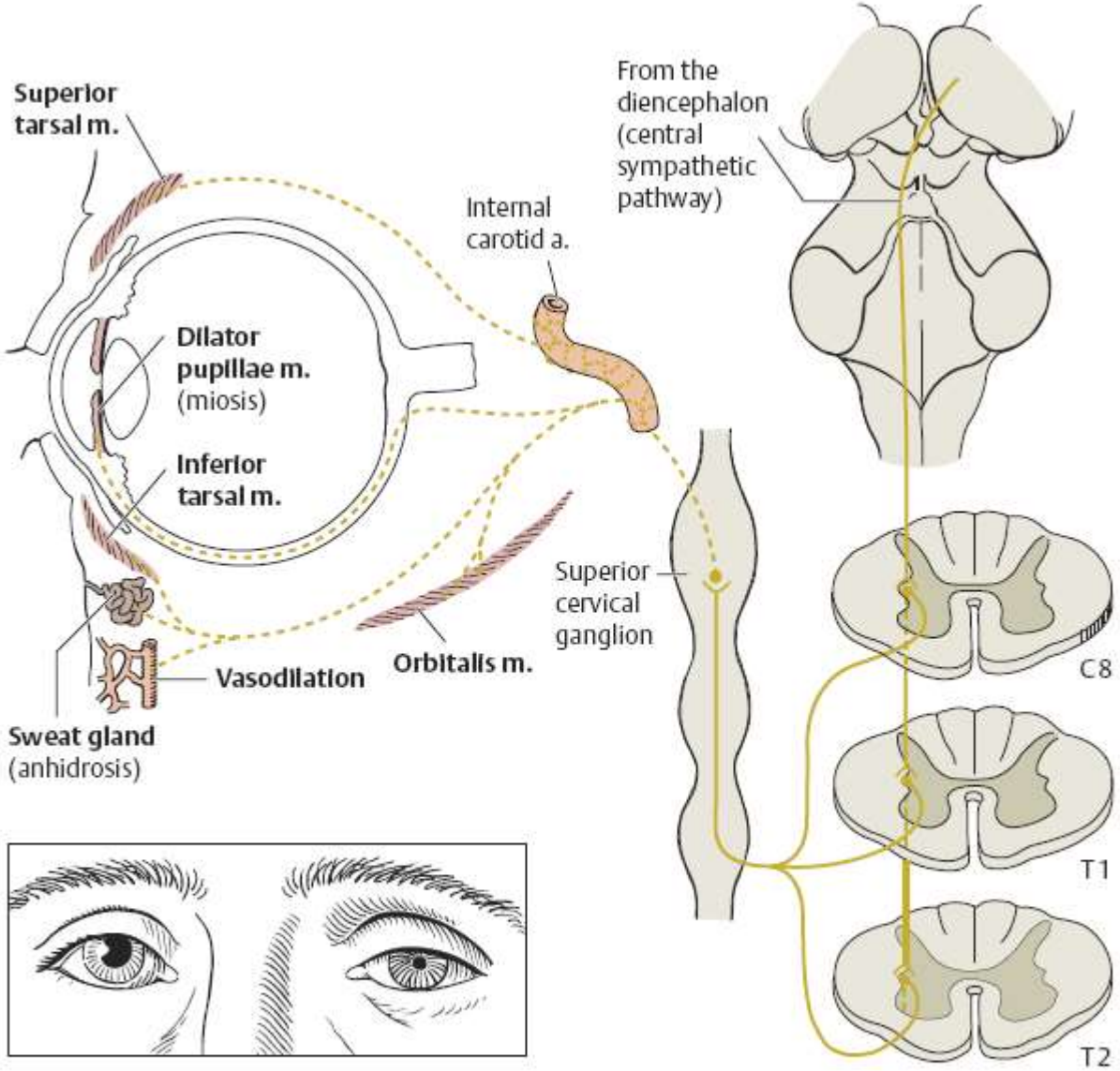


Fig. 4.28 **The sympathetic innervation of the eye and Horner syndrome.** In the region of the eye, sympathetic efferents innervate not only the dilator pupillae muscle (see Fig. 4.27), but also the tarsal muscles and the orbitalis muscle. The sympathetic innervation of the sweat glands of the face and of its vasculature (vasoconstrictor fibers) is also shown.

NERVUS TRIGEMINUS (v)

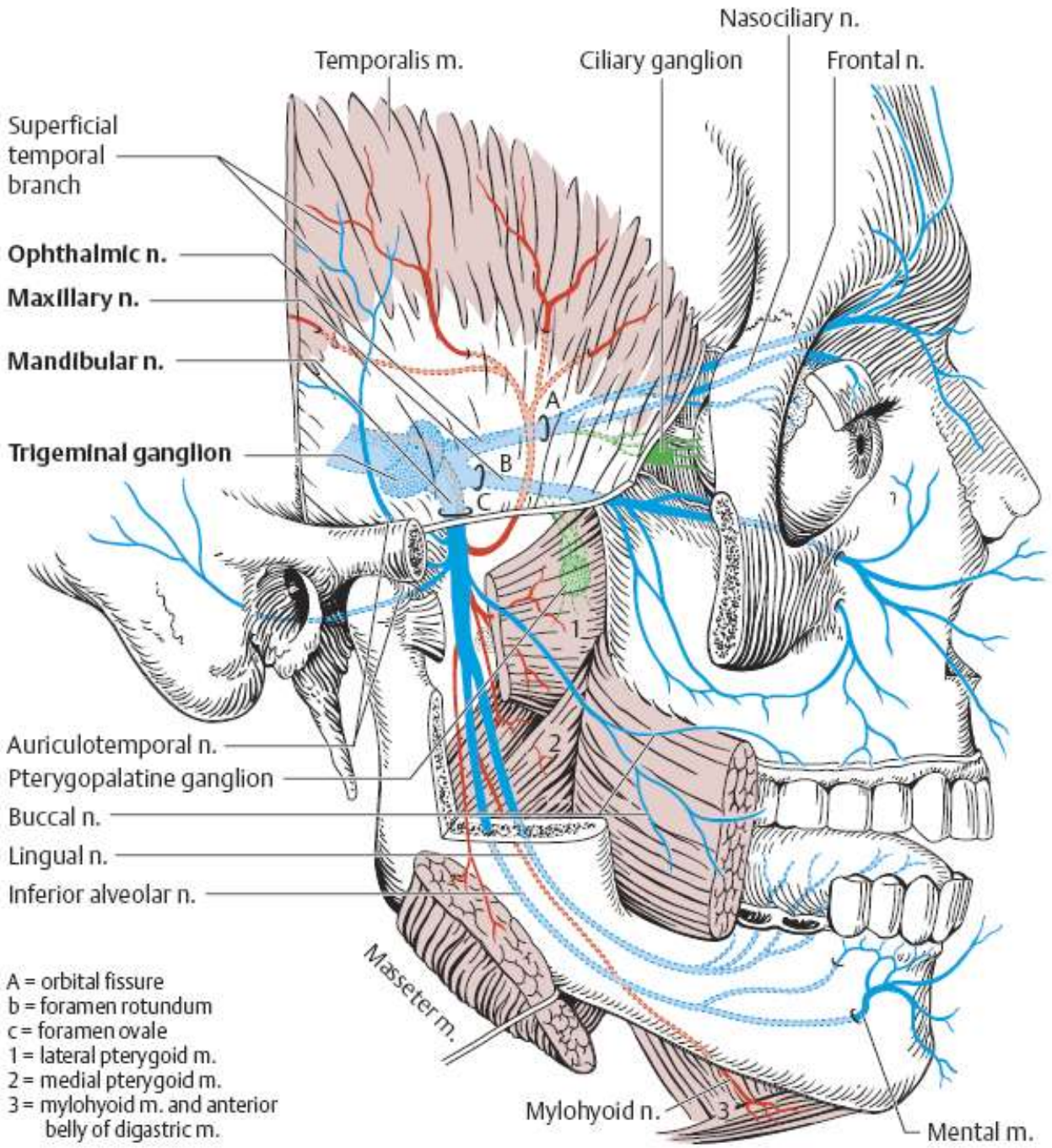


Fig. 4.29 **Peripheral course of the somatosensory and motor fibers of the trigeminal nerve**

NERVUS TRIGEMINUS (v)

- Somato motorik
  - Nukleus motorik N.V pertengahan pons portio minor foramen ovale N.V Cab.3

    otot-otot pengunyah

    otot dasar mulut
- Somato sensibel terdiri dari :
  - N.V cab.1 = N.oftalmikus : serabut aferen fis.orb.sup sinus kavernosus ganglion Gasseri.
  - N.V. cab 2 = N.maksilaris : serabut aferen for infra orbital for.rotundum sin.kavernosus ganglion Gasseri
  - N.V cab.3 = N.mandibularis : aferen for.ovale gang. Gasseri.

Serabut-serabut aferen ganglion gasseri inti induk somatosensibel traktus trigeminothalamikus thalamus.

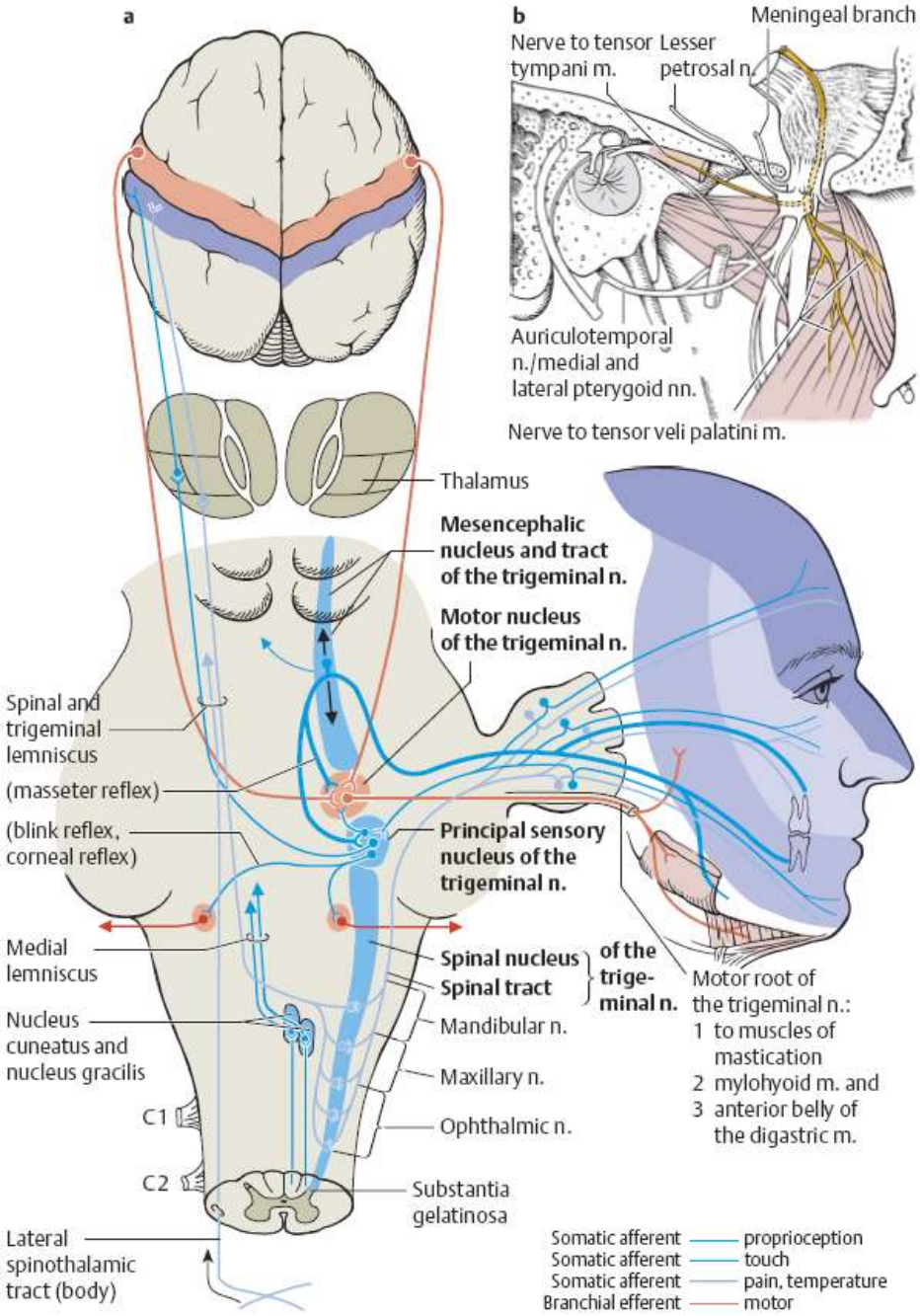


Fig. 4.30 **a Central connections of the various trigeminal fibers and their corresponding nuclei** (schematic drawing). **b** Motor root of the trigeminal nerve.

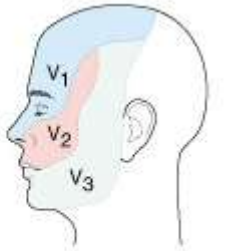
Distribution of sensory innervation to skin of face from CN V

CN V = Trigeminal

V_1 = Opthalmic

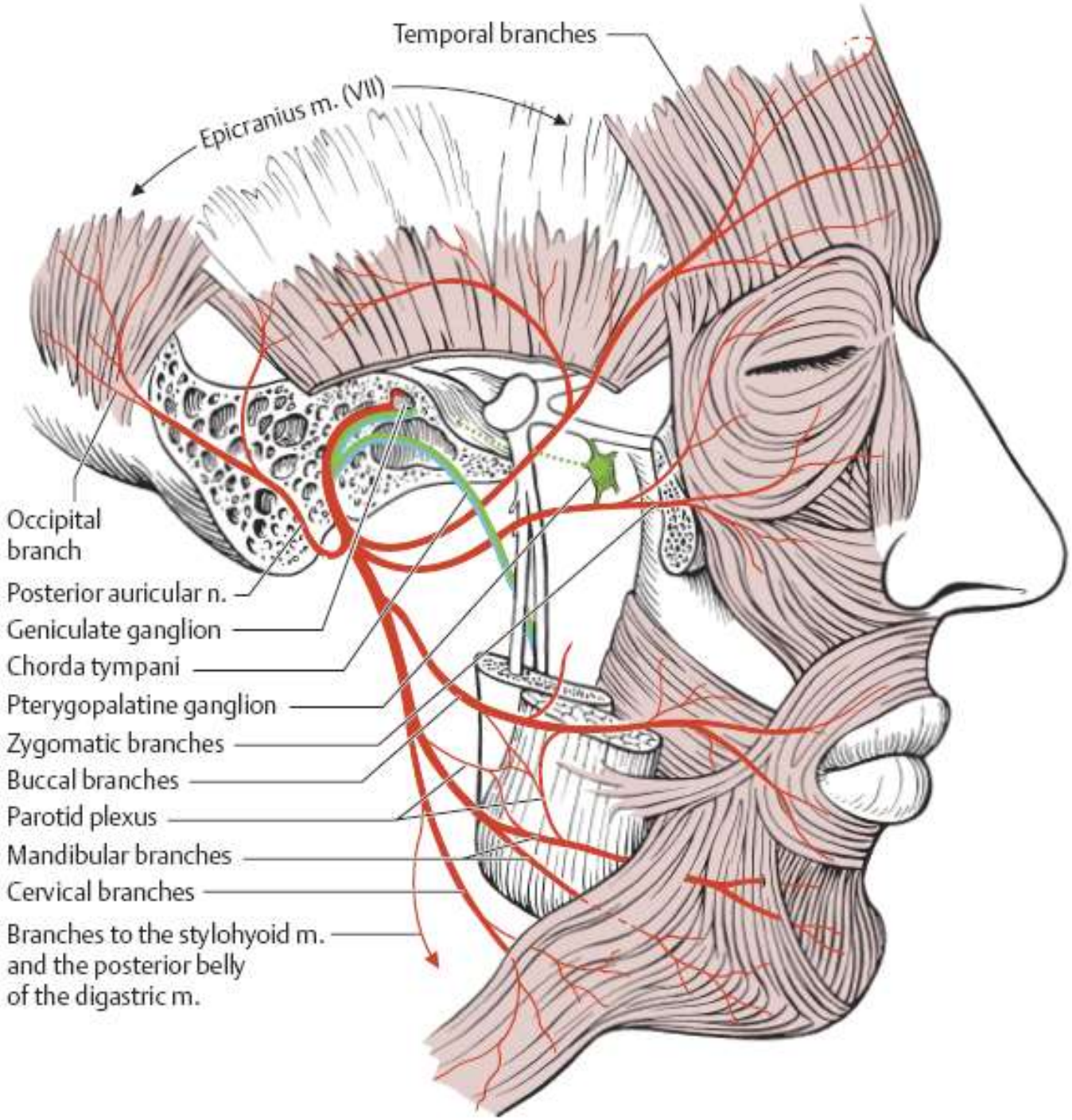
V_2 = Maxillary

V_3 = Mandibular

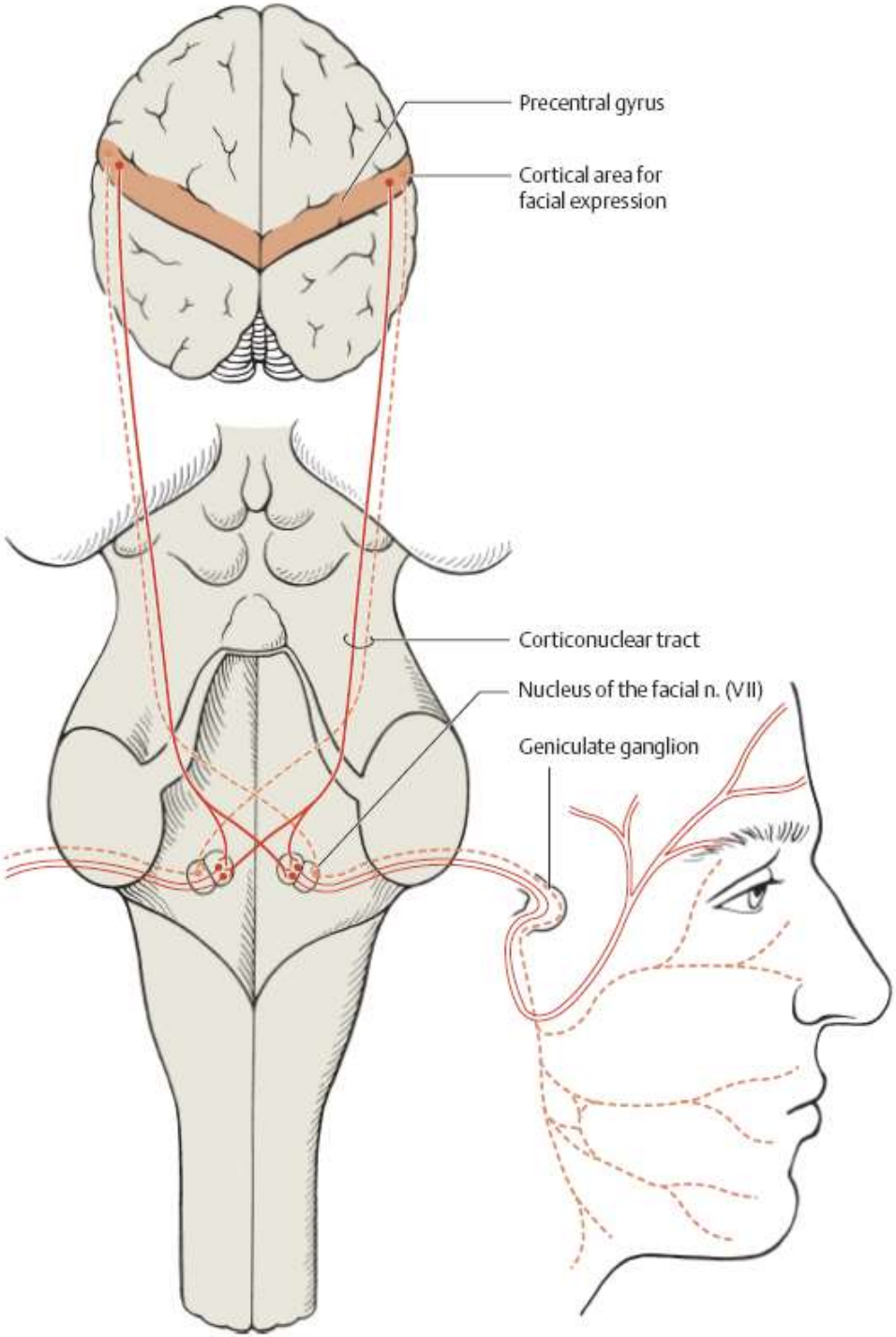


Distribution of sensory fibers of each division

Nervus VII PERIFER



Nervus VII CENTRAL



Central innervation of the facial nuclear area in the brainstem.

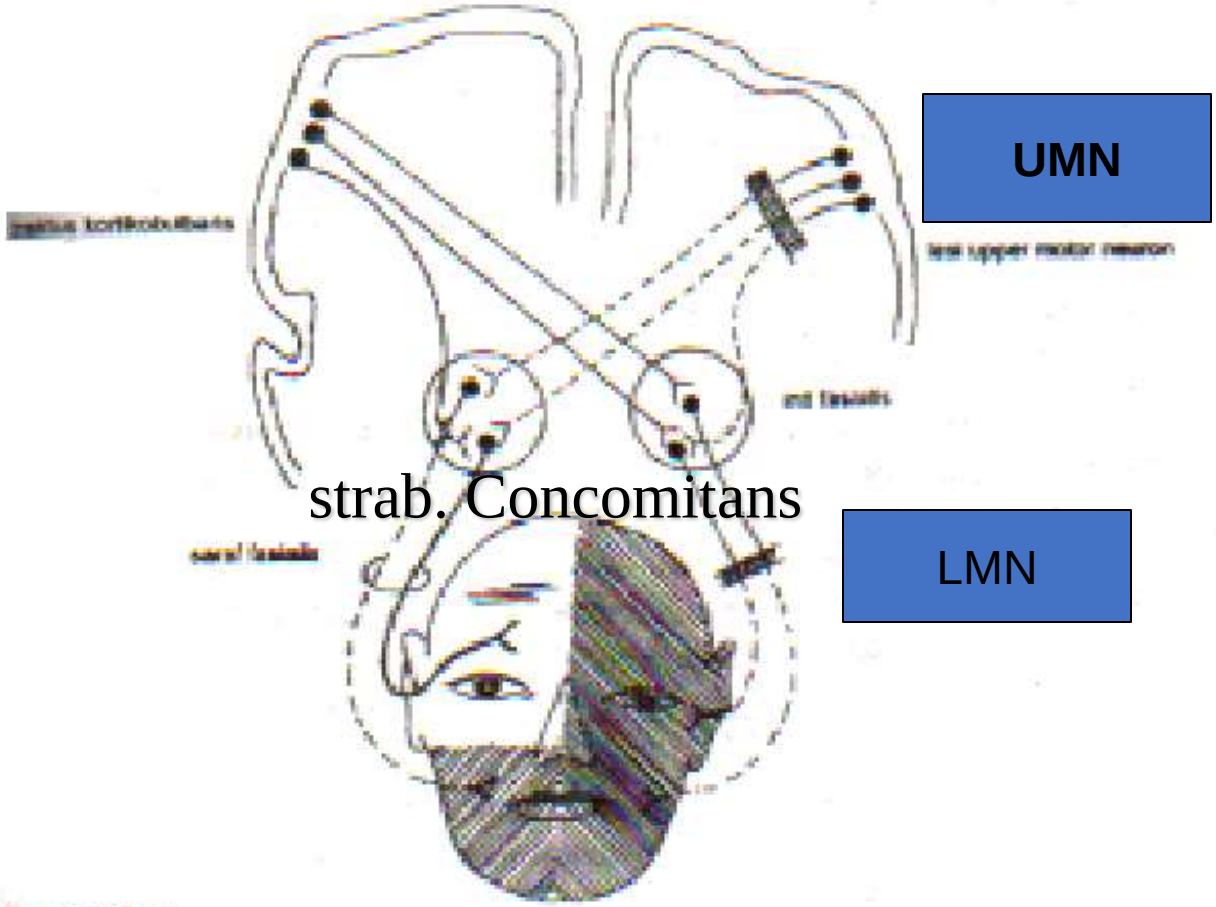
Nervus fasialis (VII)

- Serabut-serabut somatomotorik :
  - Nuk.mot.N.VII Neuraksis Nuc.N.VI meninggalkan btg otak PAI canalis fasialis for st.mast : ~ dahi
    ~ mata
    } Dahi mata bilateral
    ~ mulut unilateral

Nukleus motorik N.VII : persarafan secara bilateral dan secara kontralateral dr korteks motorik hemisfer

- Visero sensorik (pengecap) :
  - 2/3 bag. Depan lidah korda timpani ggl genikulatum nukleus intermedius nukleus traktus solitarius thalamus
- Visero motorik (parasimpatik) :
  - Nuc.sal.sup ggl sphenopal. mukosa & kel.farings.
    can.fasialis korda timpani :
    gl.sub maks
    gl.sub.ling

Otot2 wajah mendpt persarafan dr 2 sisi



strab. Concomitans

UMN

LMN

Gambar 5.15.
Bagan Persarafan otot wajah
Pareset otot wajah, disebabkan oleh lesi UMN dan LMN nervus VII.

Gejala-gejala ggn N.fasialis

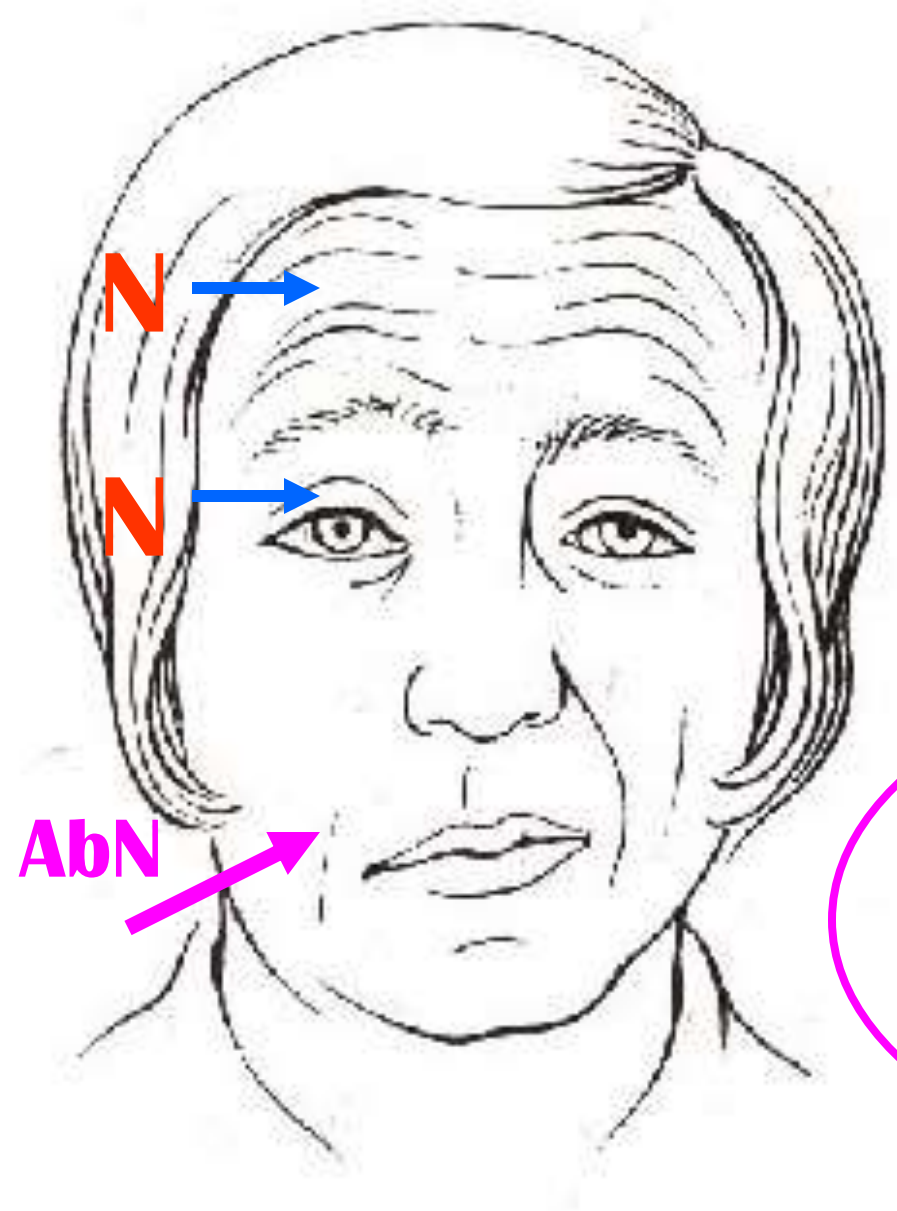
1. Ggn. Motorik :
   - parese fasialis perifer
   - Parese fasialis sentral
2. Ggn. Pengecap
3. Ggn. Pendengaran

Px memejamkan mata kuat2 & meringis

@ Lagoptalmos
@ OD ada gerakan Bolamata keatas = Tanda Bell's
@ Hiperacusis
@ Ageusia

?

Parese N VII Perifer



?

Parese N VII Kanan
Tipe UMN / Central
LESI Cortex/ Subcortex

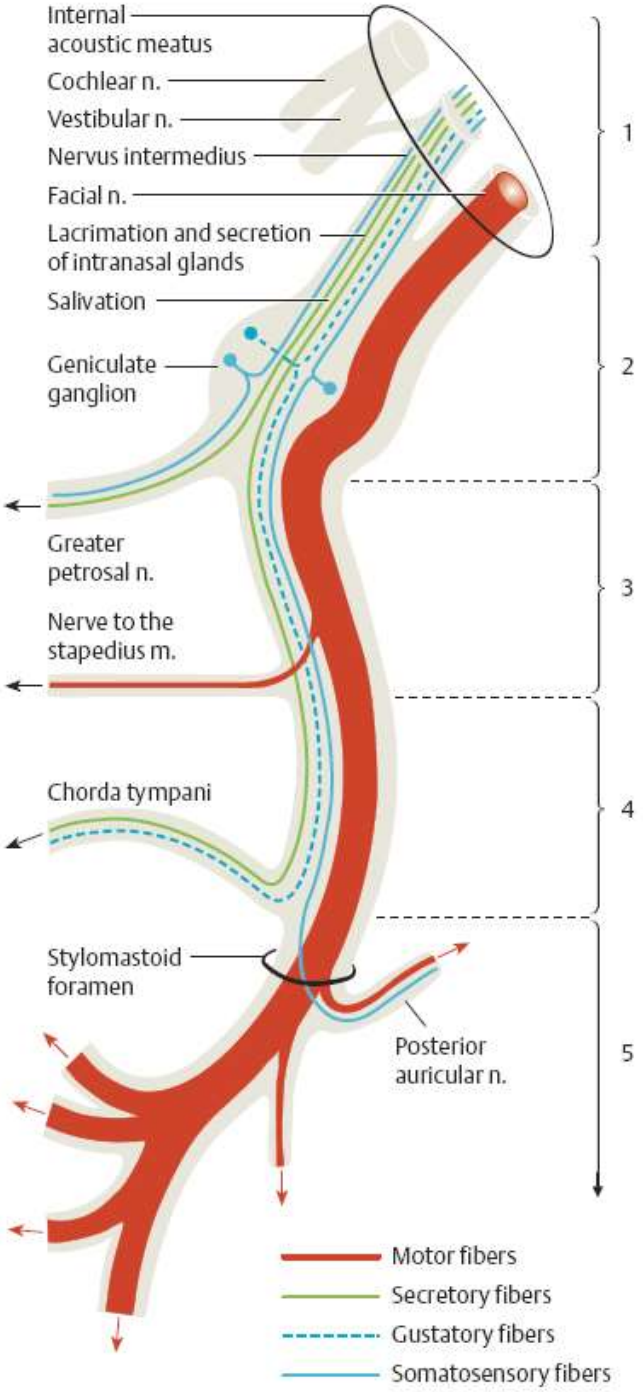


Fig. 4.35 **The components of the facial nerve and typical deficits caused by lesions at various sites along its course**

1 Peripheral weakness of the muscles innervated by the facial nerve (muscles of facial expression), hearing loss or deafness, and diminished vestibular excitability.

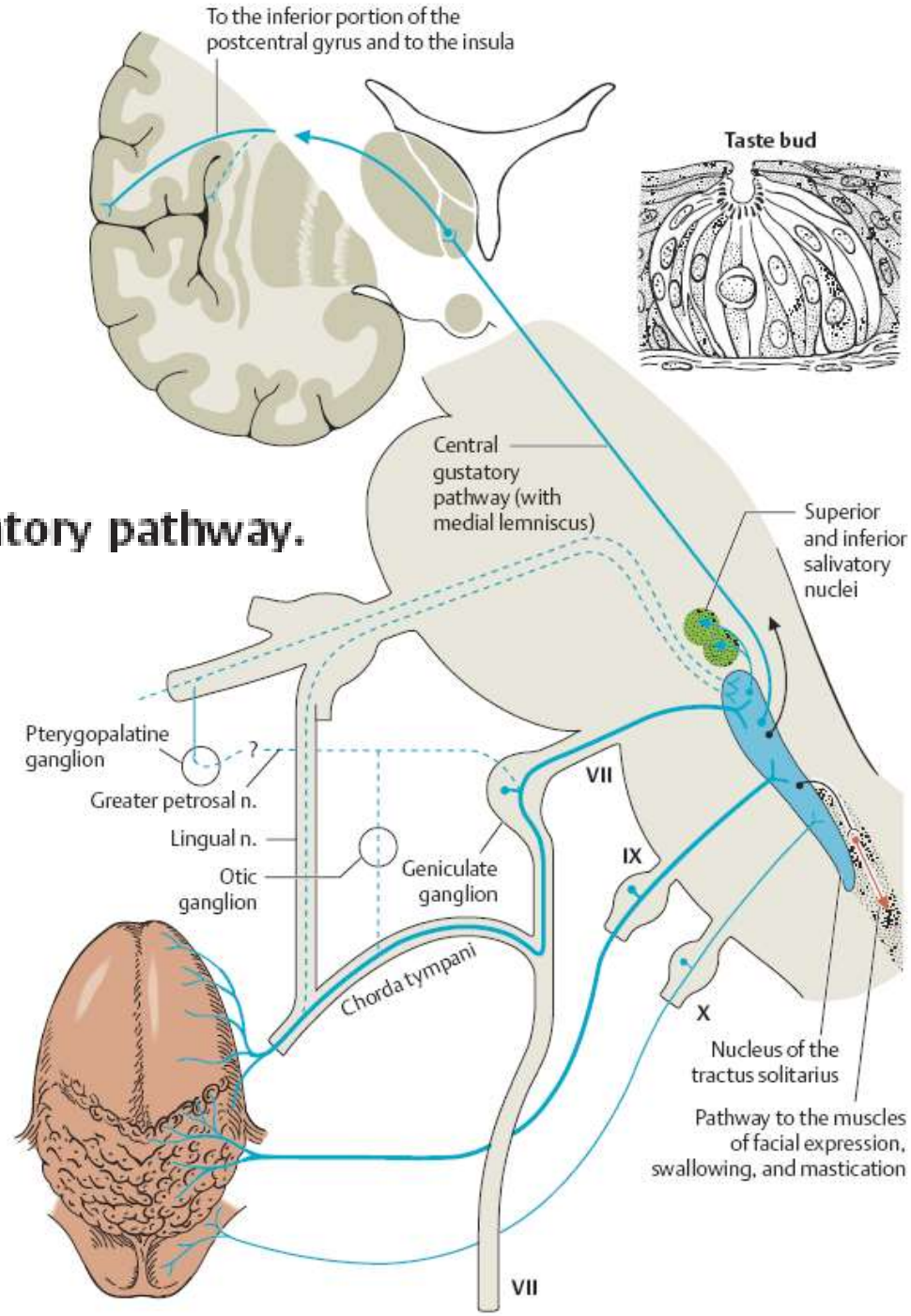
2 Peripheral weakness and impairment of taste, lacrimation, and salivation.

3 Peripheral weakness of the muscles of facial expression, impairment of taste and salivation, and hearing loss.

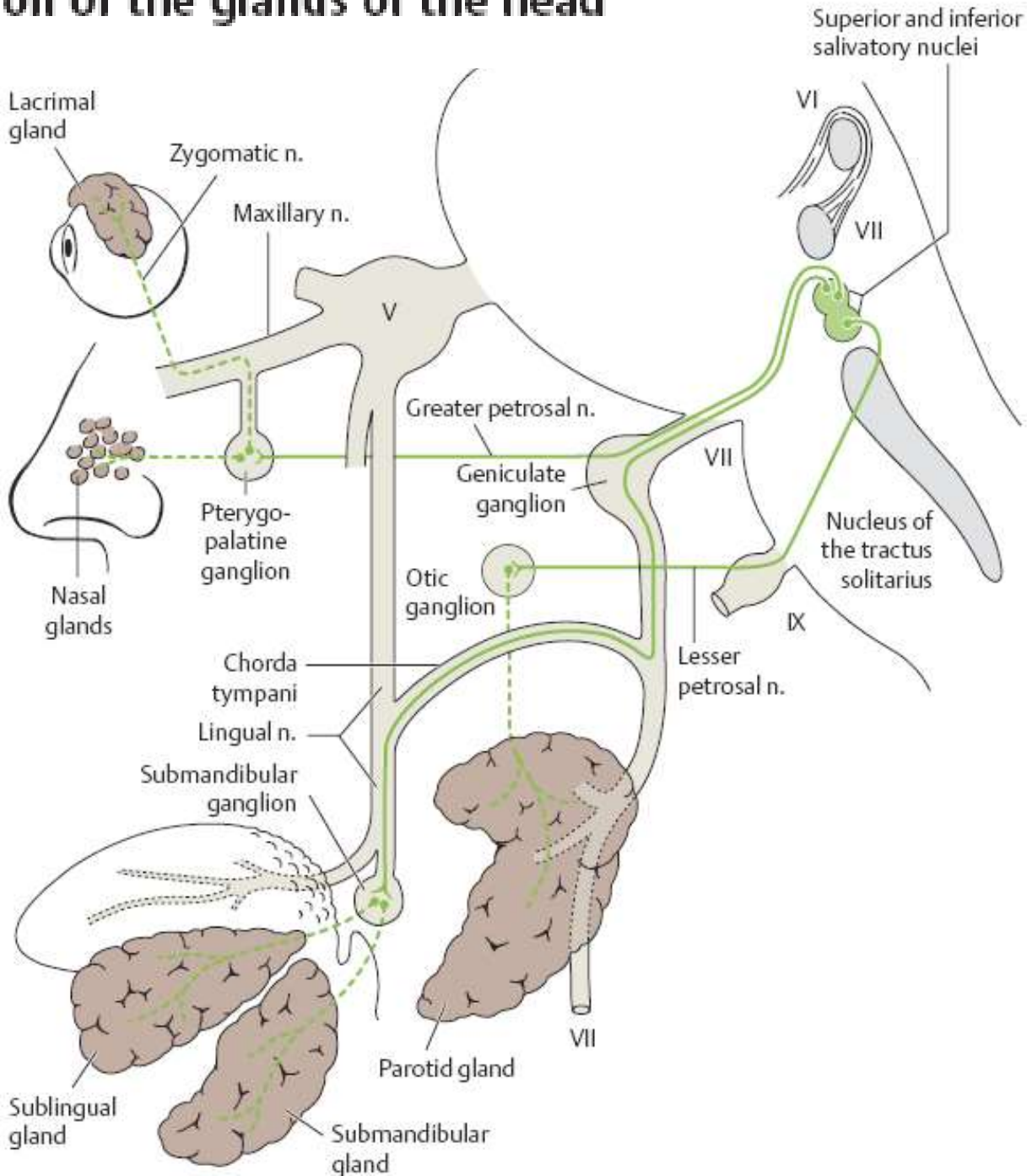
4 Peripheral weakness of the muscles of facial expression and impairment of taste and salivation.

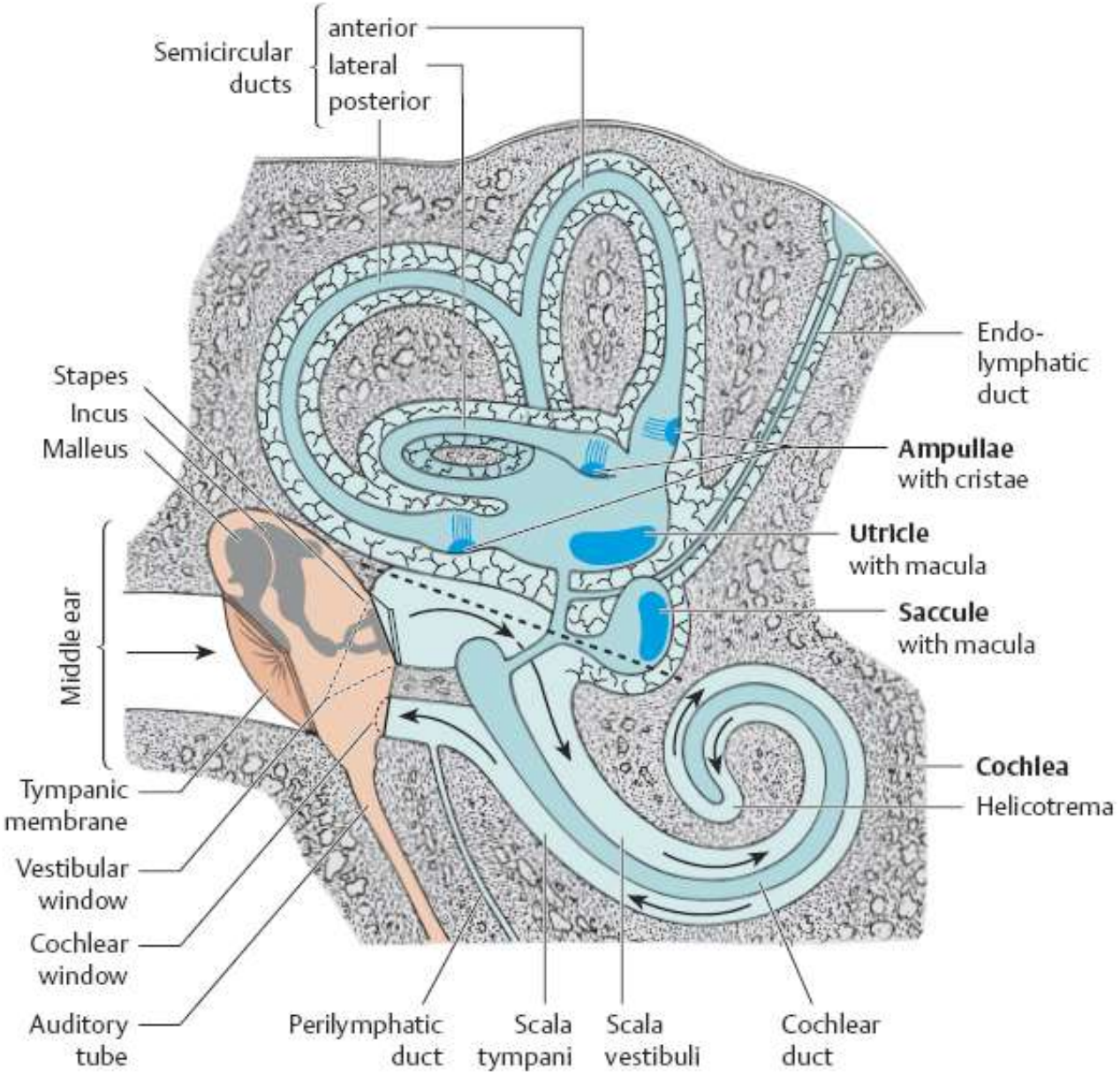
5 Peripheral weakness of the muscles of facial expression.

Afferent gustatory fibers and the gustatory pathway.



Parasympathetic Innervation of the glands of the head





ORGAN PENDENGARAN DAN KESEIMBANGAN

Nervus Akustikus (VIII) :

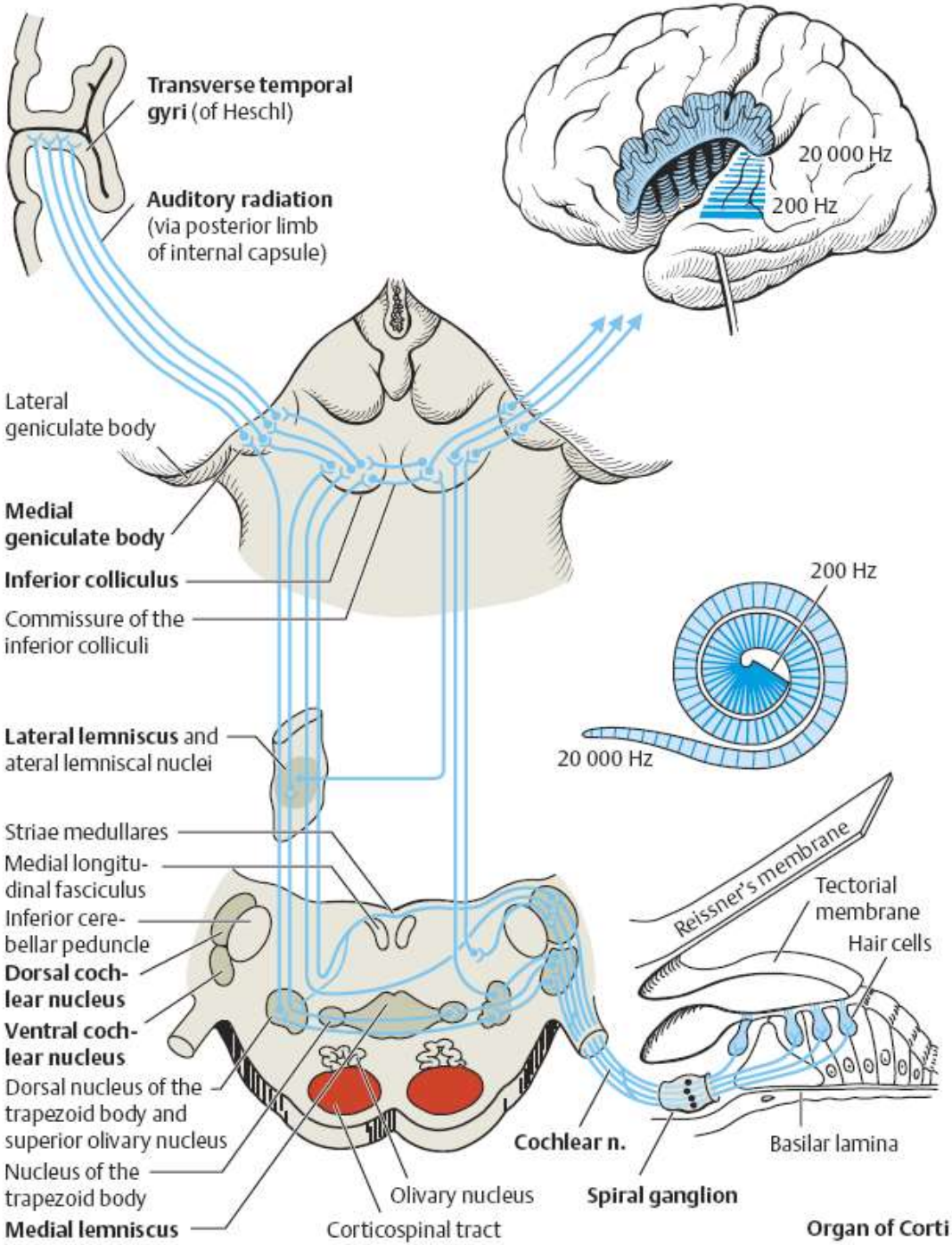
- Nervus cochlearis

  Serabut-serabut somatosensorik yg khas untuk

  menghantar impuls akustis

  Impuls akustis reseptor (organon korti) ggl spirale PAI nukleus cochlearis lemniskus lateralis korteks pendengaran (area 41) pd girus temporali post superior.

The auditory pathway.



Nervus Akustikus (VIII) :

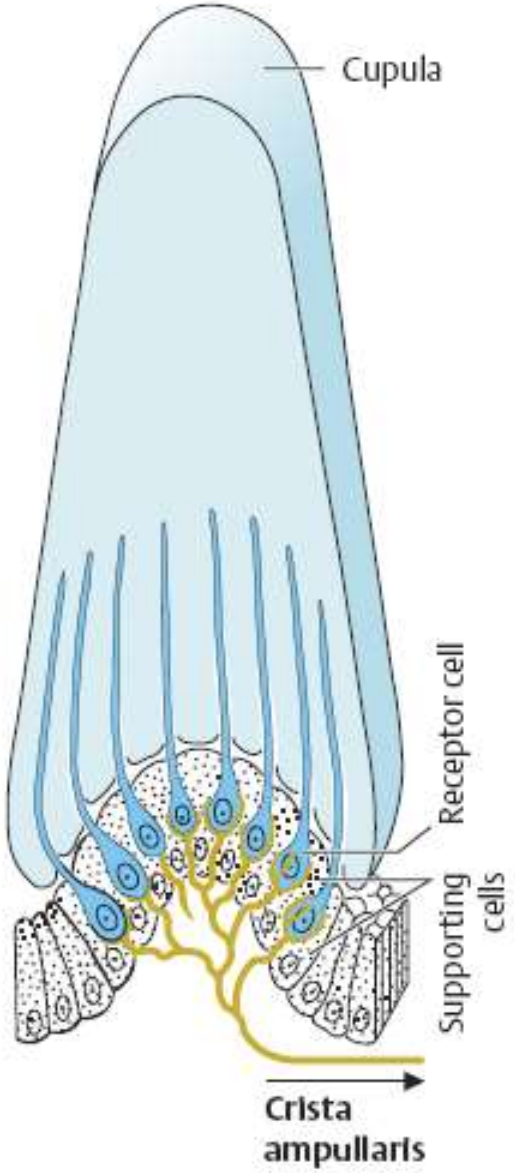
- Nervus vestibularis

Serabut-serabut somatosensorik u/ menghantar impuls keseimbangan.

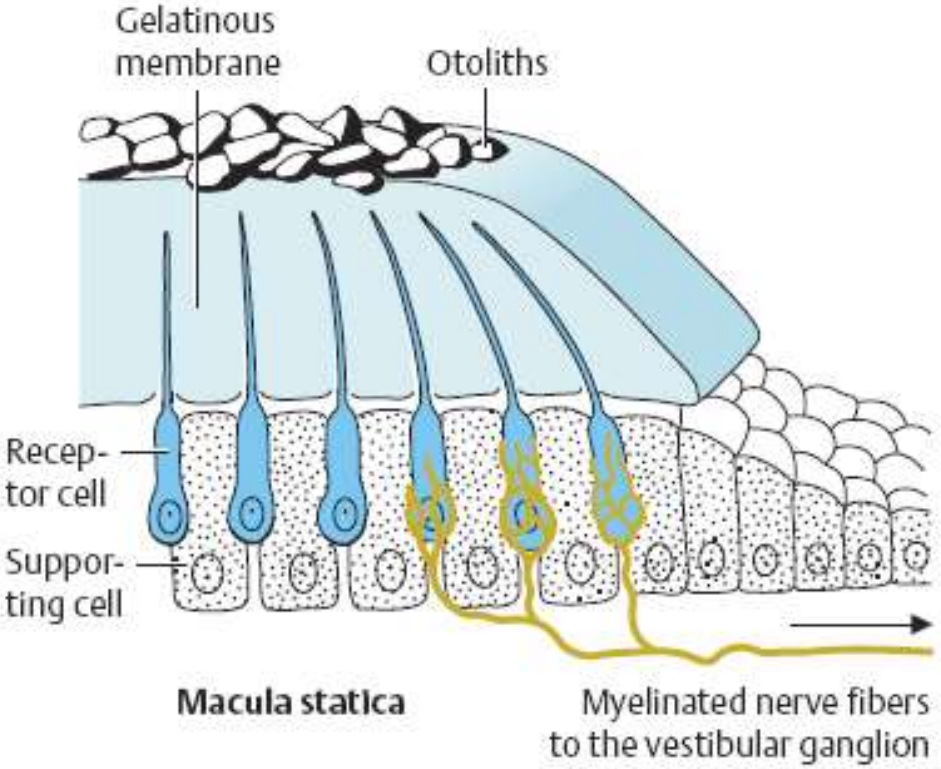
Reseptor : Neuroepitelium dr ampula senisirkularis & makula utriculus dan saculus ggl vestibulare PAI nukleus vestibularis pusat k'imbangan di otak serebellum

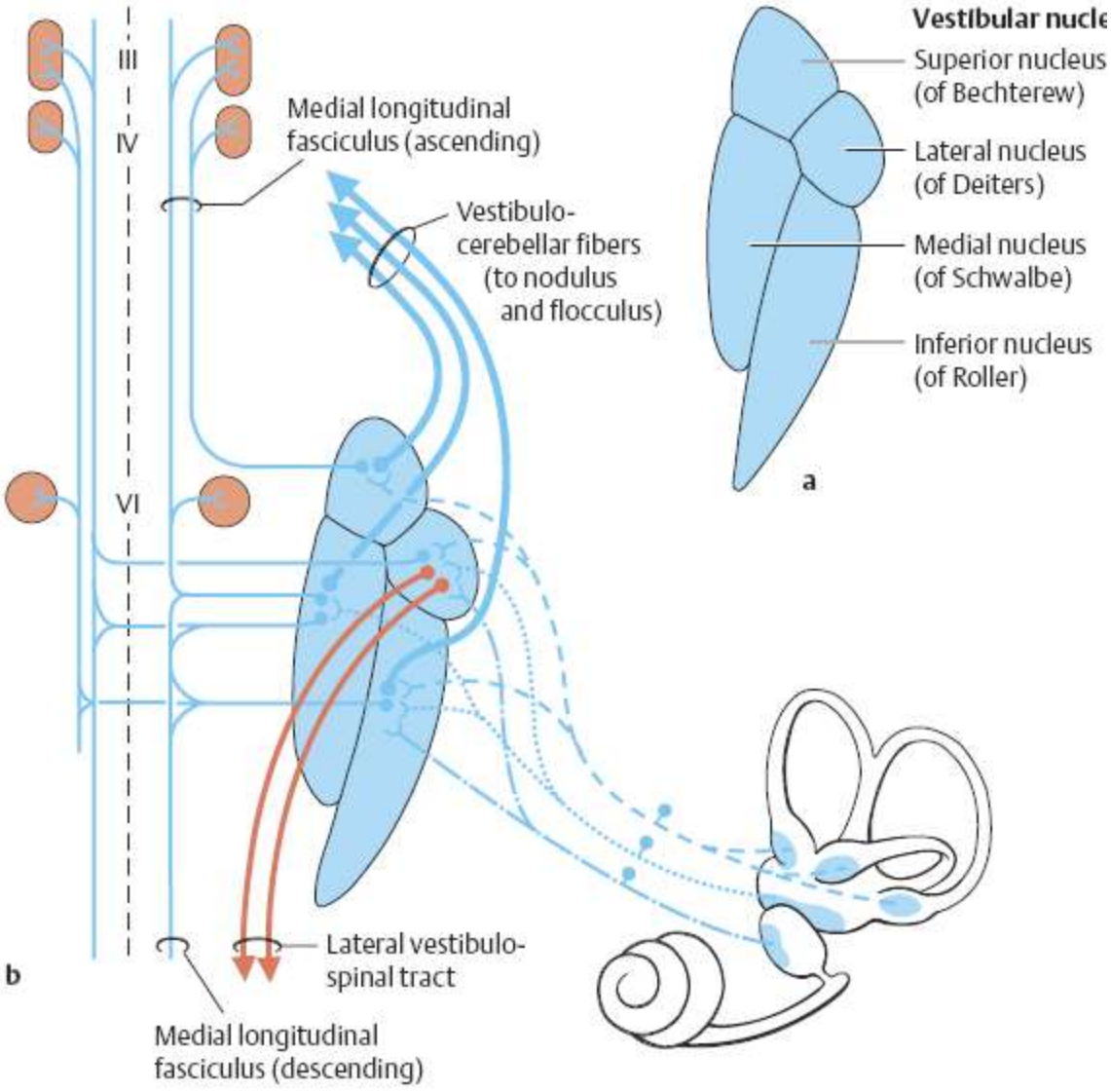
 motor neuron : batang otak n.III,IV,VI

med.spinal.servikal



The crista ampullaris





The vestibular nuclear complex and its central connections.

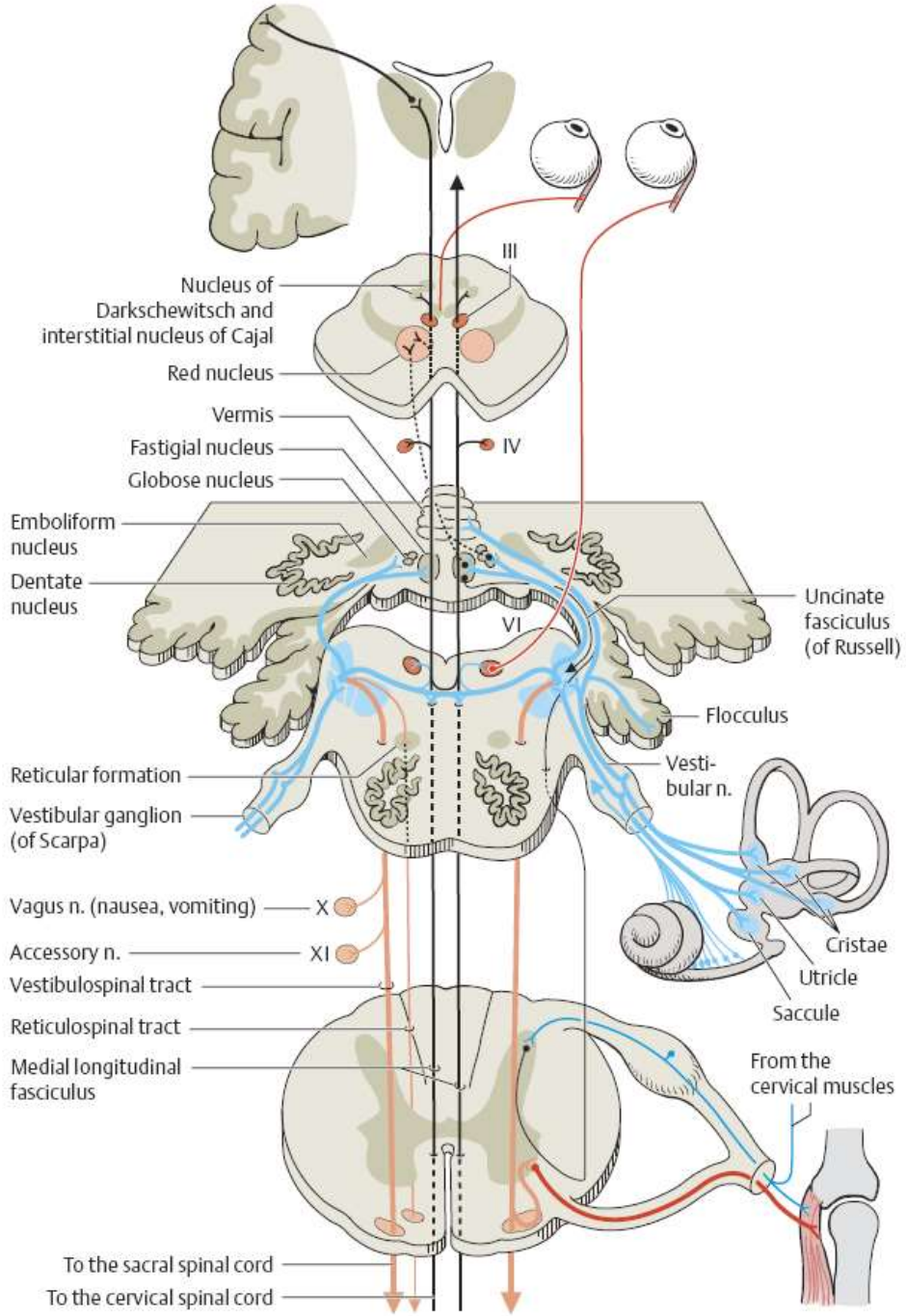


Fig. 4.47 **Central connections of the vestibular nerve**

NERVUS IX DAN X

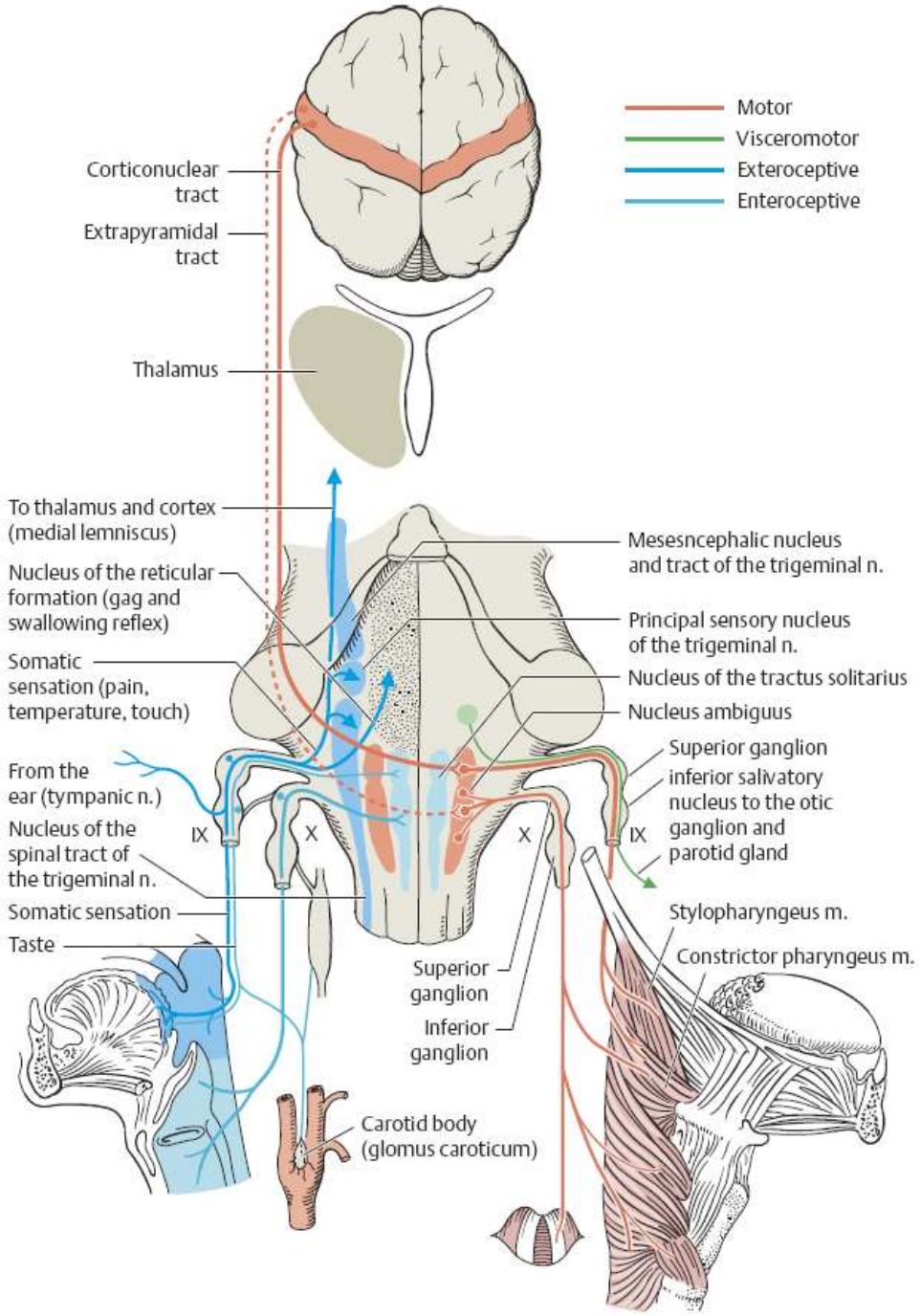


Fig. 4.48 Distribution and central connections of the glossopharyngeal and vagus nerves

Nervus Glossofaringeus (IX)

- Somato motorik : nuc.ambiguus otot-otot bag.atas farings.
- Visero motorik (parasimpatis): nukleus salifatorius inf. foramen jugulare ggl ootikum kelenjar parotis.
- Visero sensorik (pengecap) / somato sensorik :
  - 1/3 lidah bgn belakang
  - Mukosa farings, tonsil, kavum timpani
  - Sinus karotikus.

Nervus vagus (X)

- Somato motorik : nuk.ambiguus → pal.molle
  larings
  farings
- Visero motorik : nuk.dorsalis vagi : kelenjar
  otot polos
  organ.
- Visero sensorik : serabut-serabut aferen (faring, laring, trakhea, visc) → ggl nodosum → nukleus trak sol
- Somato sensorik : serabut aferen (kulit, mae, dura fossa posterior) → ggl jugulare → nukleus trak.spinalis nn.trig

N. Vagus (X)

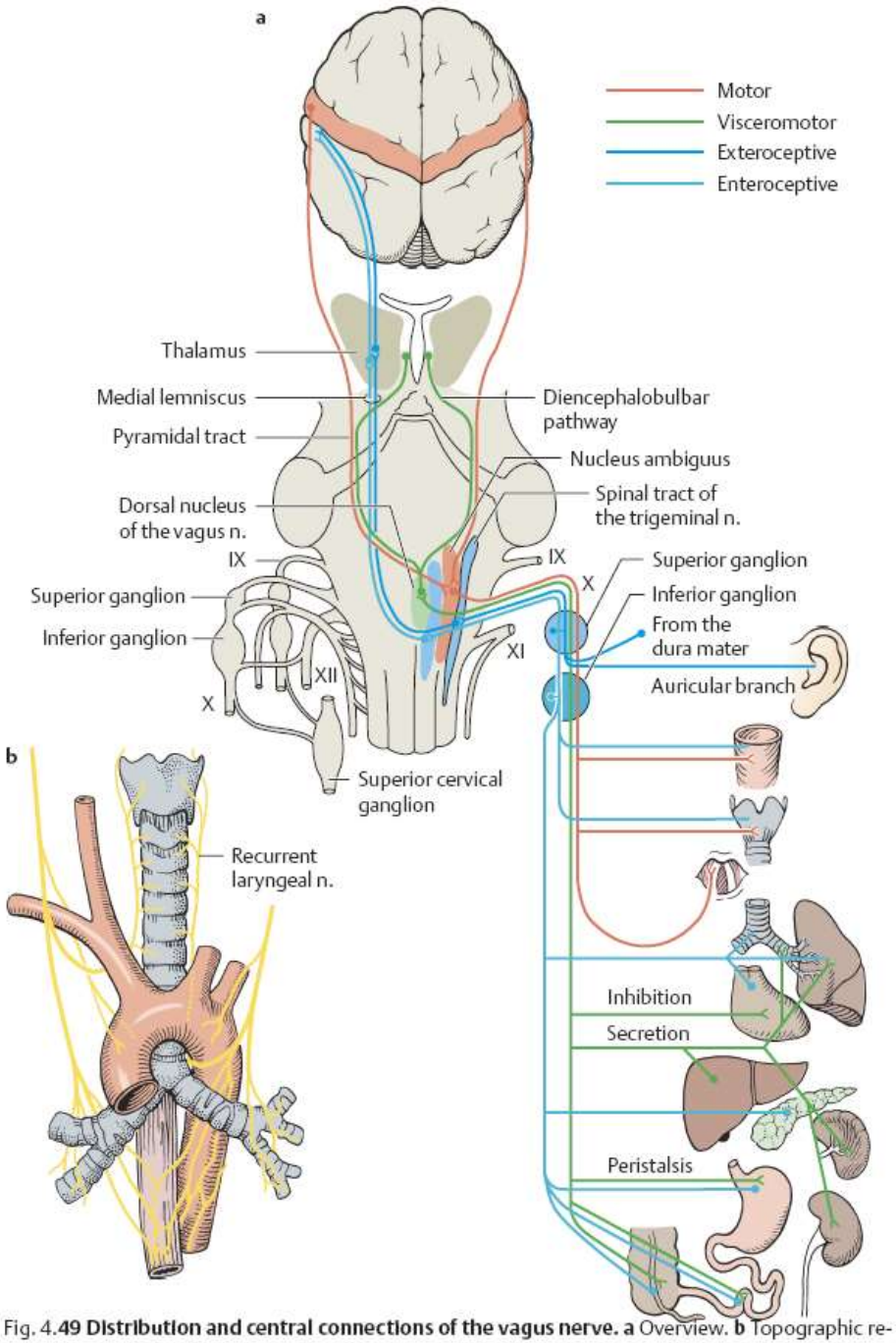
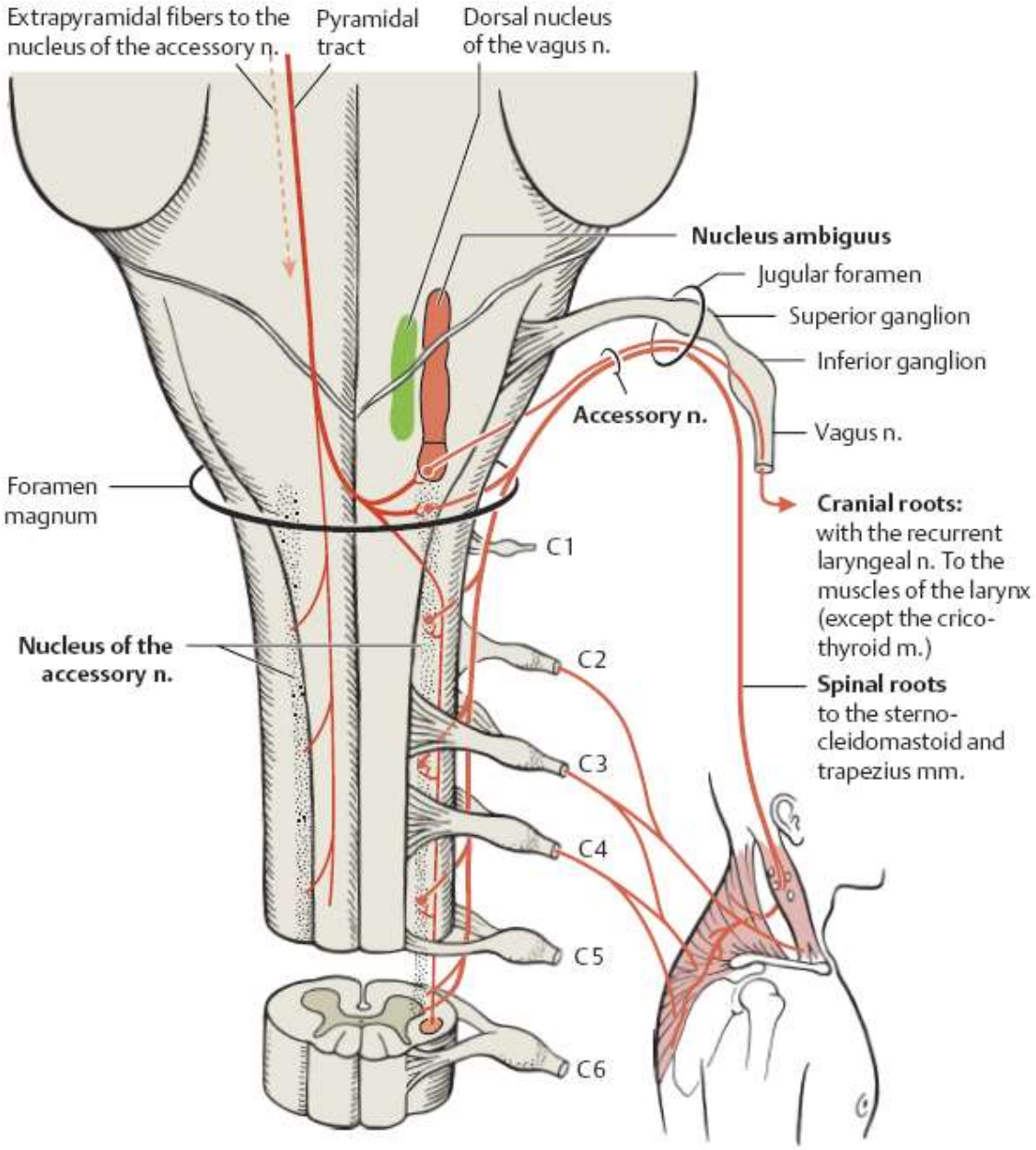


Fig. 4.49 **Distribution and central connections of the vagus nerve. a** Overview. **b** Topographic relations of the recurrent laryngeal nerve.

Nervus assesorius (XI)

- Motorik :
  - Nuk. Motorik eferen foramen jugulare
    m.st.cl.mast
- Pemeriksaan :
  - Atrofi
  - Angkat bahu
  - Sikap kepala



Nervus Accessorus / XI

Nervus Hipoglosus (XII)

- Motorik :
  - Nukleus hipoglosus (med.oblongata) □ eferen □ kanalis hipoglosus
- Gejala-gejala :
  - Dysarthri
  - Defiasi lidah
  - Sulit menelan
- Lesi supranuklear :
  - atrofi lidah tidak ada
  - Fasciculasi tidak ada
- Lesi infranuklear :
  - Atrofi otot lidah
  - Fasciculasi positif

Cat.

Nukleus motorik hipogloosus mendapat persarafan sec. kontralateral dr korteks mortorik hemisfer.

Nervus XII (hipoglosus)

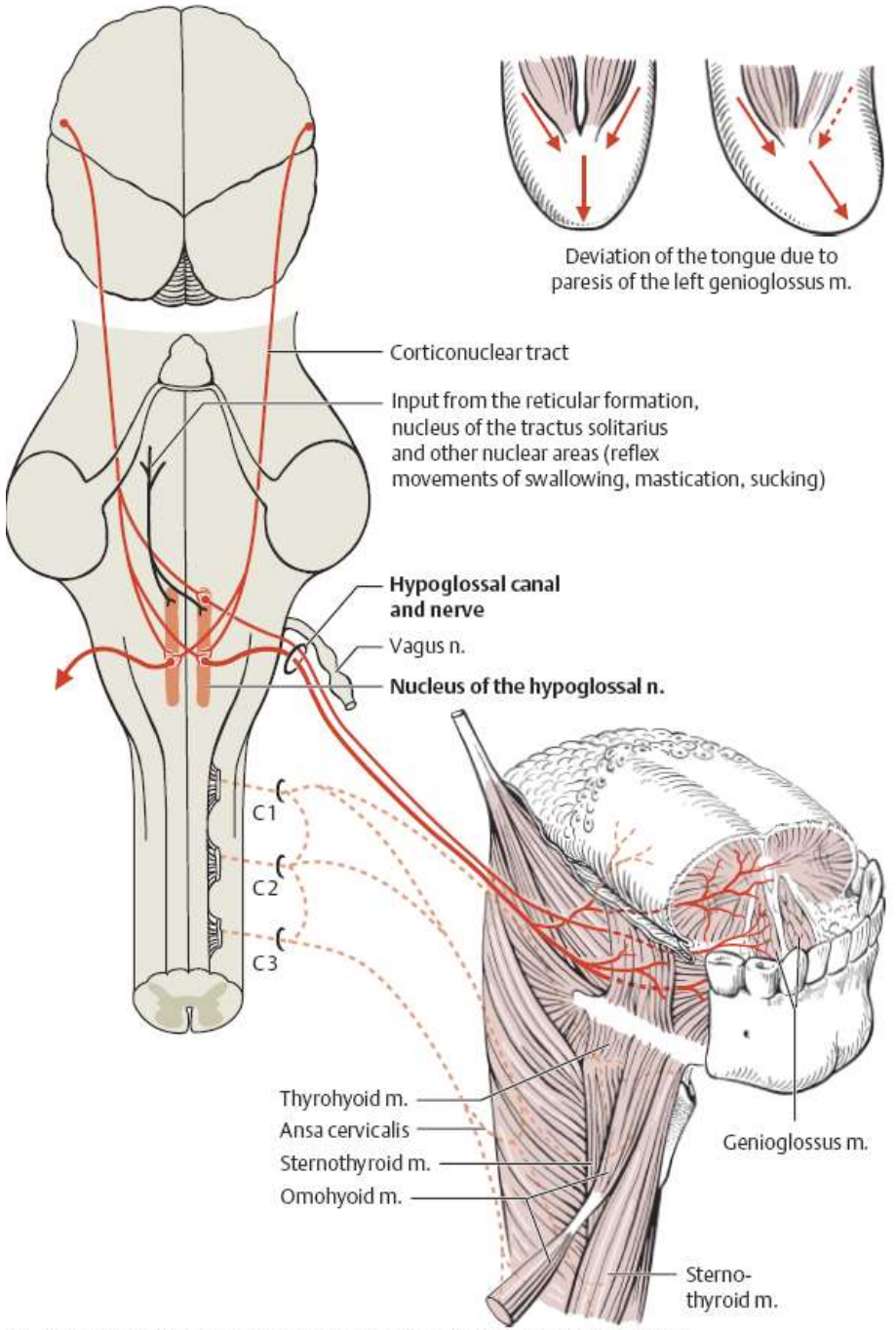


Fig. 4.51 Distribution and central connections of the hypoglossal nerve

Summary of Functional Groups

- Purely Sensory = I, II, VIII
- Primarily Motor = IV, VI, XI, XII
- Mixed = III, V, VII, IX, X

- Parasympathetic Fibers = III, VII, IX, X (Division of Autonomic NS = Visceral Motor)

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Parasympathetic Fibers

- CN III = Oculomotor
  - Contracts Iris (controls pupil)
  - Contracts Ciliary Muscle (controls lens)
- CN VII = Facial
  - Innervates Salivary glands (mandibular & sublingual)
  - Innervates Lacrimal gland
- CN IX = Glossopharyngeal
  - Innervates Parotid Salivary gland
- CN X = Vagus
  - Innervates thoracic & abdominal viscera