Peripheral Nervous System

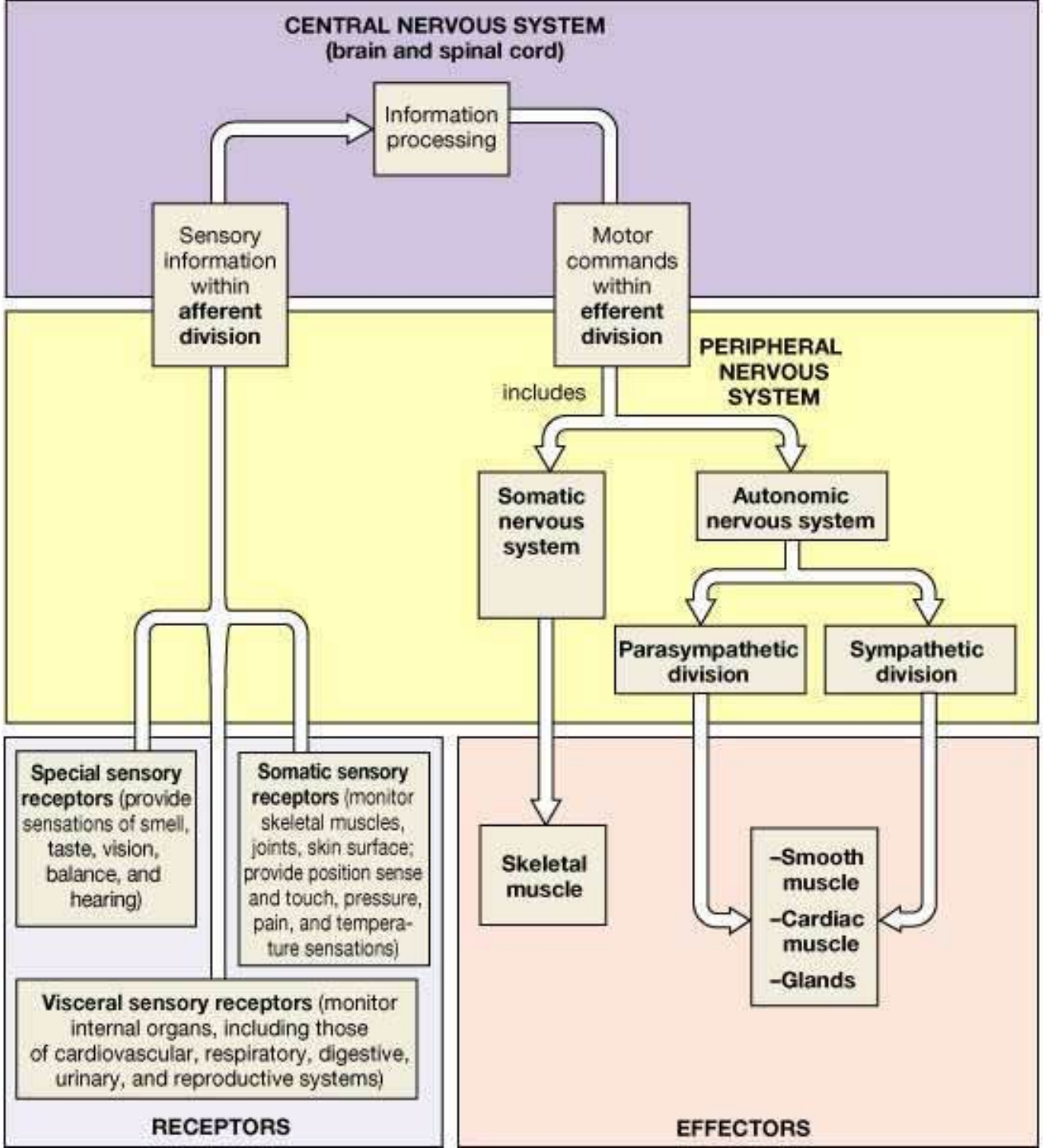
desy andari

Gambaran umum

- Seluruh jaringan saraf di dalam tubuh yang menyatukan dan menyelaraskan fungsi2 jaringan lain dalam tubuh.
- Sensorik : rangsang (aff) CNS dan
- Motorik : CNS (eff) bbg struktur tubuh (somatik dan otonom).

Komponen

- **Central Nervous System (CNS) dan Peripheral Nervous System (PNS).**
- **Neuron dan sel glia**
- **Sinapsis: tempat interaksi anatomis dan fungsional antara neuron-neuron.**


CENTRAL NERVOUS SYSTEM
(brain and spinal cord)
Information processing
Sensory information within afferent division
Motor commands within efferent division
PERIPHERAL NERVOUS SYSTEM
includes
Somatic nervous system
Autonomic nervous system
Parasympathetic division
Sympathetic division
Special sensory receptors (provide sensations of smell, taste, vision, balance, and hearing)
Somatic sensory receptors (monitor skeletal muscles, joints, skin surface; provide position sense and touch, pressure, pain, and temperature sensations)
Visceral sensory receptors (monitor internal organs, including those of cardiovascular, respiratory, digestive, urinary, and reproductive systems)
RECEPTORS
Skeletal muscle
–Smooth muscle
–Cardiac muscle
–Glands
EFFECTORS

NEURON

- **Tdd: badan sel dan julurannya (dendrit dan axon).**
- **Diameter : 5- 150 µm.**

- **Klasifikasi berdasar fungsi:**
  - **Neuron sensorik: rangsang (dalam dan luar) CNS.**
  - **Interneuron: menghubungkan neuron dalam satu rangkaian (neuron sensorik – neuron motorik) dan mengatur sinyal .**
  - **Neuron motorik: rangsang CNS neuron lain, otot dan kelenjar.**

Struktur

1. Badan sel = soma :
    1. Inti
    2. Perikaryon
    3. Membran plasma
2. Prosesus sitoplasma :
    1. Dendrit
    2. Axon

Badan sel (soma)

- **Inti**
  - **Besar, bulat.**
  - **Letak di tengah, nukleolus jelas**

- **Sitoplasma**
  - **Perikaryon [sitopl. yang mengelilingi inti]**
  - **Organella : centriole, mitokon, lisosom, golgi Nissl's substance, neurotubule & neurofilamen**

Nissl's substance

- T.d. : rough ER
- Bercak-bercak basofil

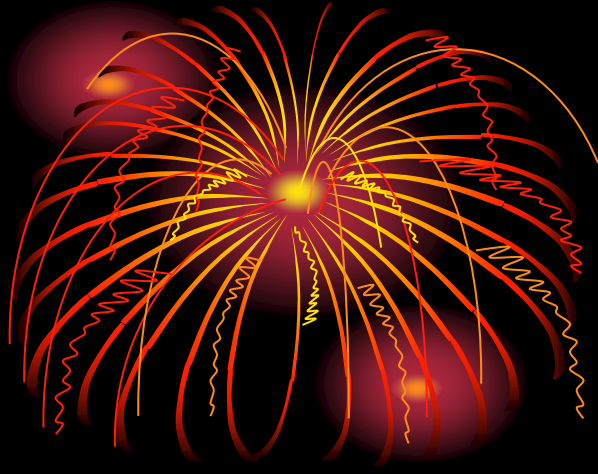
- Chromatolysis:

  Bergesernya inti dan Nissl's subst. ke tepi

Prosesus Neuron
1. Dendrit

- Fs : menerima signal / rangsang dr sel sensorik, axon dan neuron lain potensial aksi soma
- Makin keujung makin kecil & bercabang (kec. Bipolar) seperti akar
- Permukaan tdp duri2 ber<< krn usia atau gizi buruk.

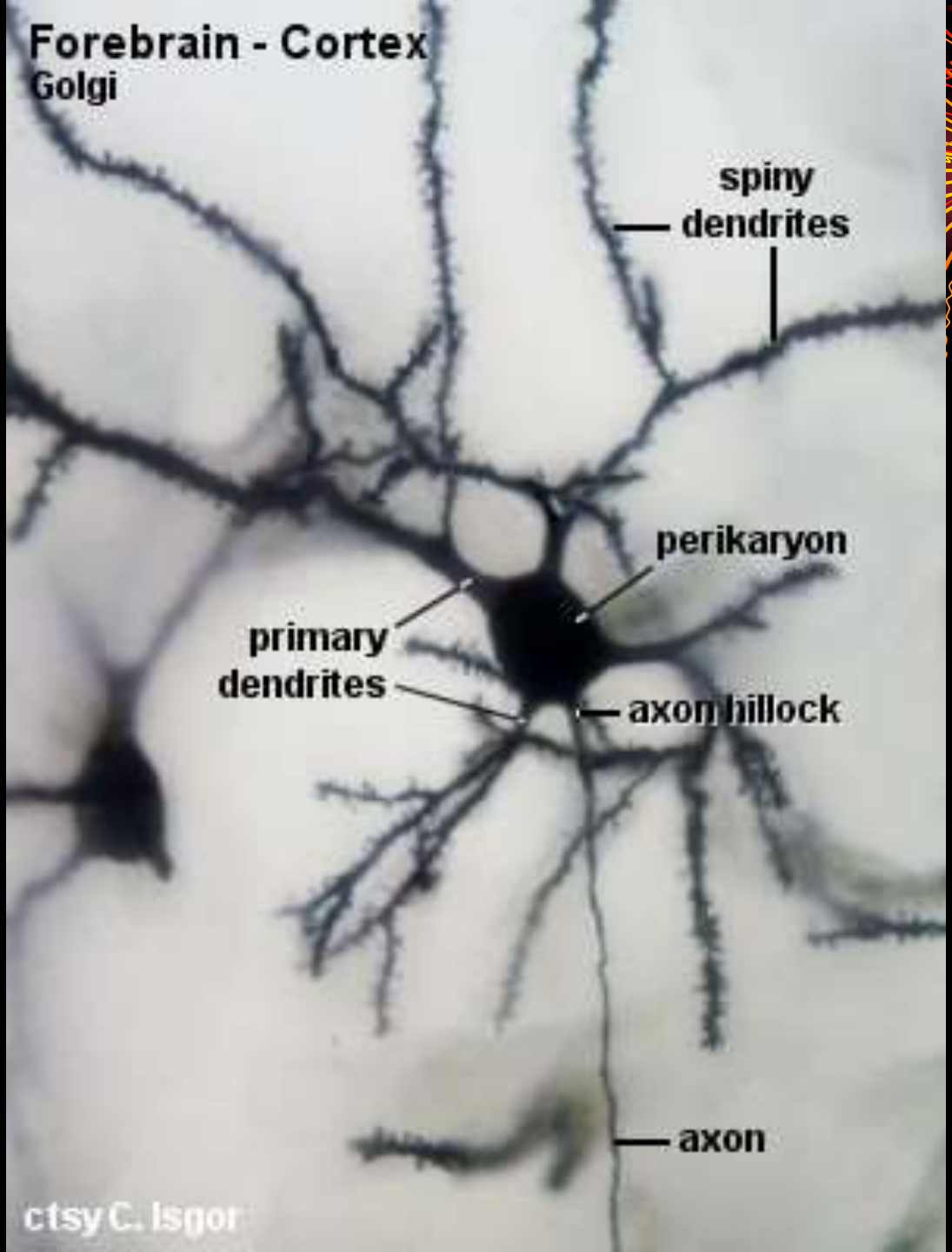
2. Axon



- Jumlah 1
- Diameter → sama di sepanjang axon
- Fungsi meneruskan impuls dari badan sel

Regio axon

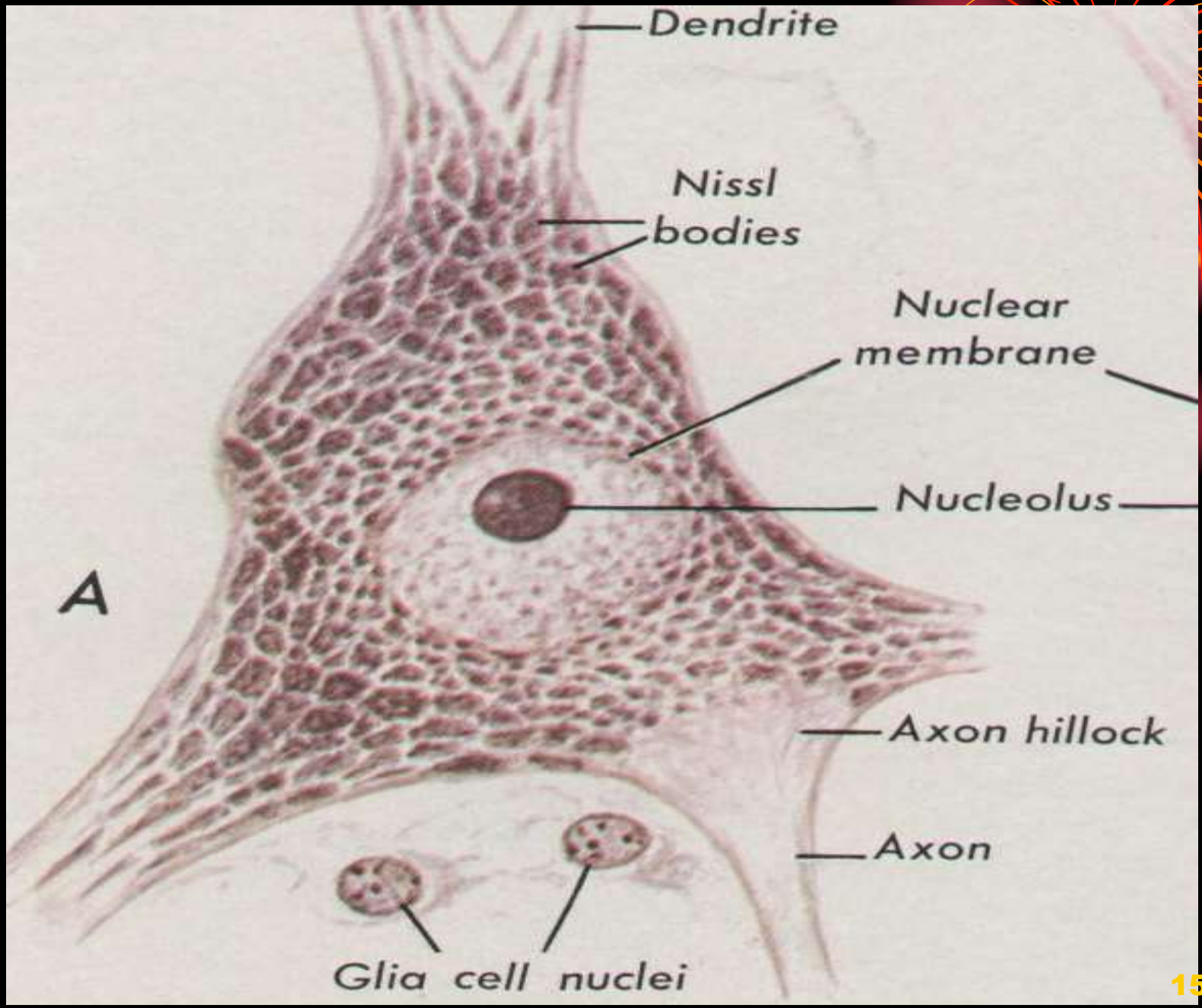
- 1. Axon hillock
- 2. Initial segment
- 3. Axon ss
- 4. Terminal arborization
- 5. Bouton


Forebrain - Cortex
Golgi
spiny
dendrites
perikaryon
primary
dendrites
axon hillock
axon
ctsy C. Isgor

Axon hillock

- pangkal axon
- Nissl's bodies [-]

- Initial segment
  - ' Myelin [-]


Dendrite
Nissl bodies
Nuclear membrane
Nucleolus
A
Axon hillock
Axon
Glia cell nuclei

Axon ss

- Bermyelin
- Mempunyai kolateral
- Organel :
  - mitokondria
  - neurotobul
  - neurofilamen

Terminal arborisasi

- Myelin [-]
- Axon bercabang-cabang
- Bouton/terminal bouton

  isi : - mitokondria

  - vesikel sekresi

Klasifikasi neuron

Berdasarkan bentuknya:

- Neuron multipolar
- Neuron bipolar
- Neuron pseudounipolar
- Neuron unipolar

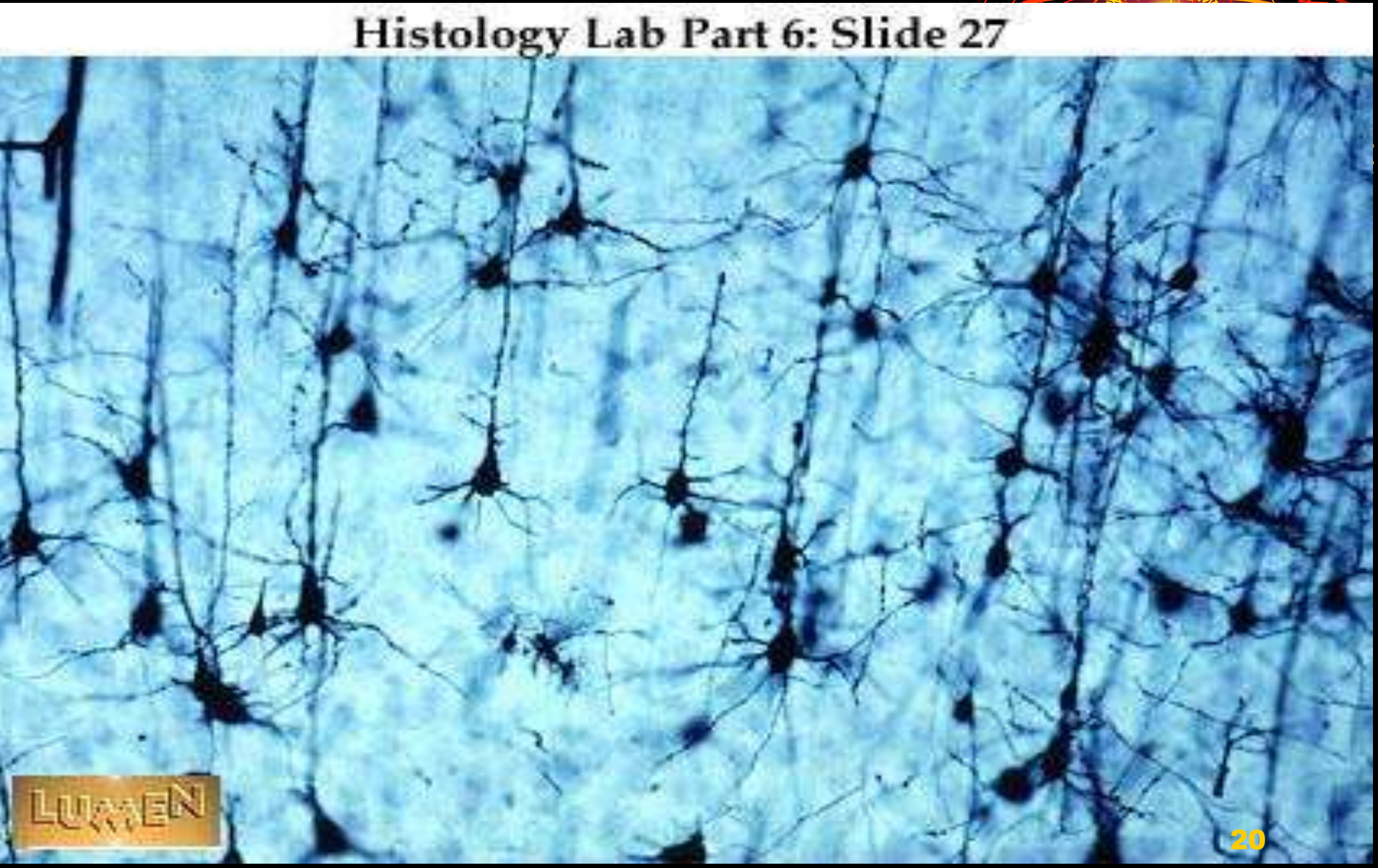
Neuron multipolar

- Neuron motoris
- Sel Purkinje
- Neuron bipolar

  1 dendrit & 1 axon

  Terdapat di retina, mukosa olfactoria, ggl cochlearis dan vestibularis

Sel saraf pyramidal cortex cerebri



Neuron pseudo unipolar

Embrio bipolar → fusi →

prosesus tunggal : spt T

p.u neuron sensoris : ggl spinalis & sebag ggl cranialis

Str percab T = axon

Neuron unipolar

*Axon pendek, dendrit (-)

Rod dan cone

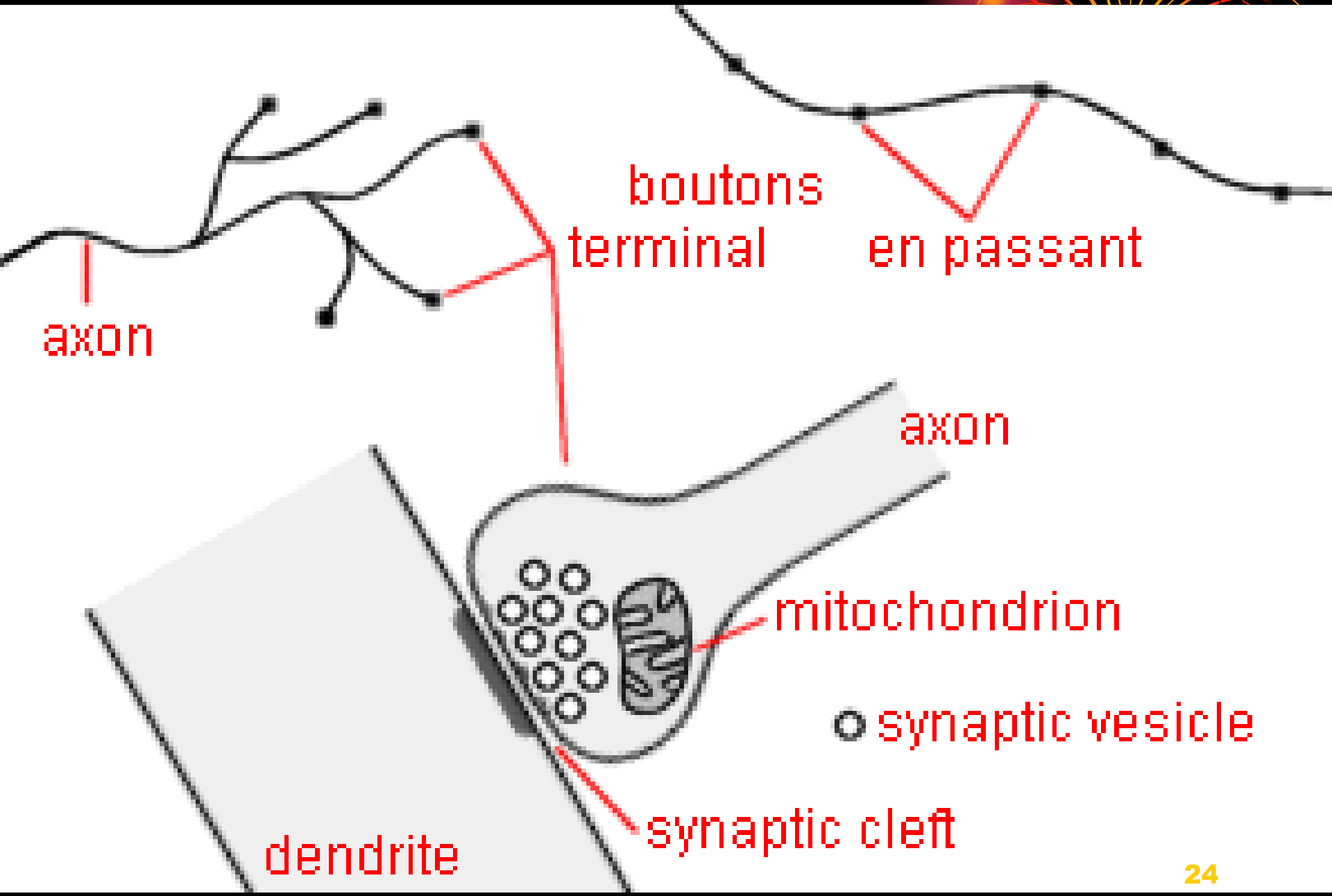
Penamaan synapse

- **Axodendritic**
- **Axoaxonic**
- **Axosomatic**
- **Dendrodendritic**

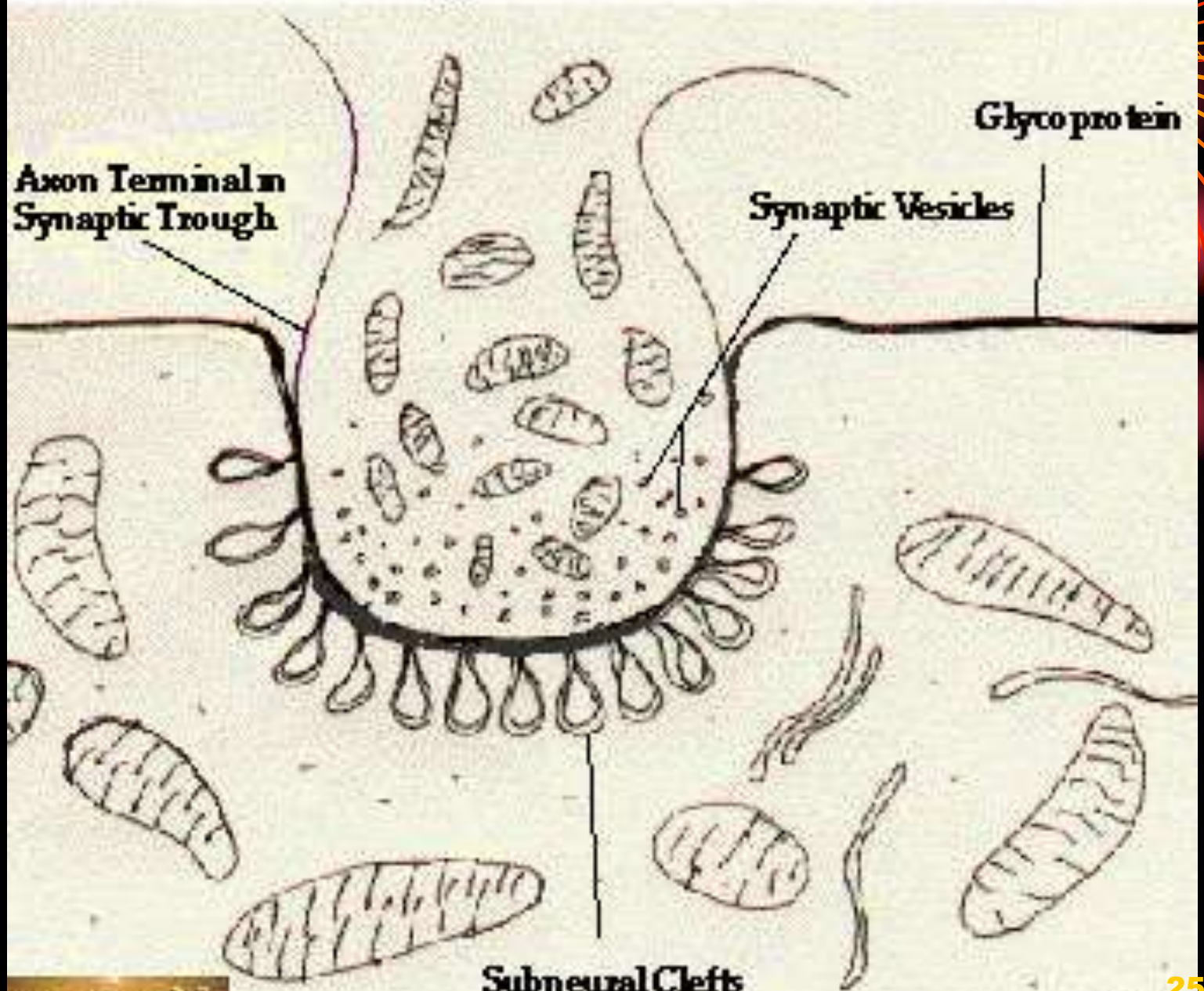
Struktur synapse

- Membran presynaptic
- Synaptic cleft
- Post synaptic membrane

- Pembuangan neurotransmitter
  - Proses enzimatik


boutons
terminal
en passant
axon
axon
mitochondrion
synaptic vesicle
synaptic cleft
dendrite

Histology Lab Part 6: Slide 21



Neuroglia

- **Fungsi**
  - **pembungkus : mielin**
  - **penunjang struktur dan fungsi neuron konduksi**
- **Terdiri dari**
  - **neuroglia CNS**
  - **neuroglia PNS**

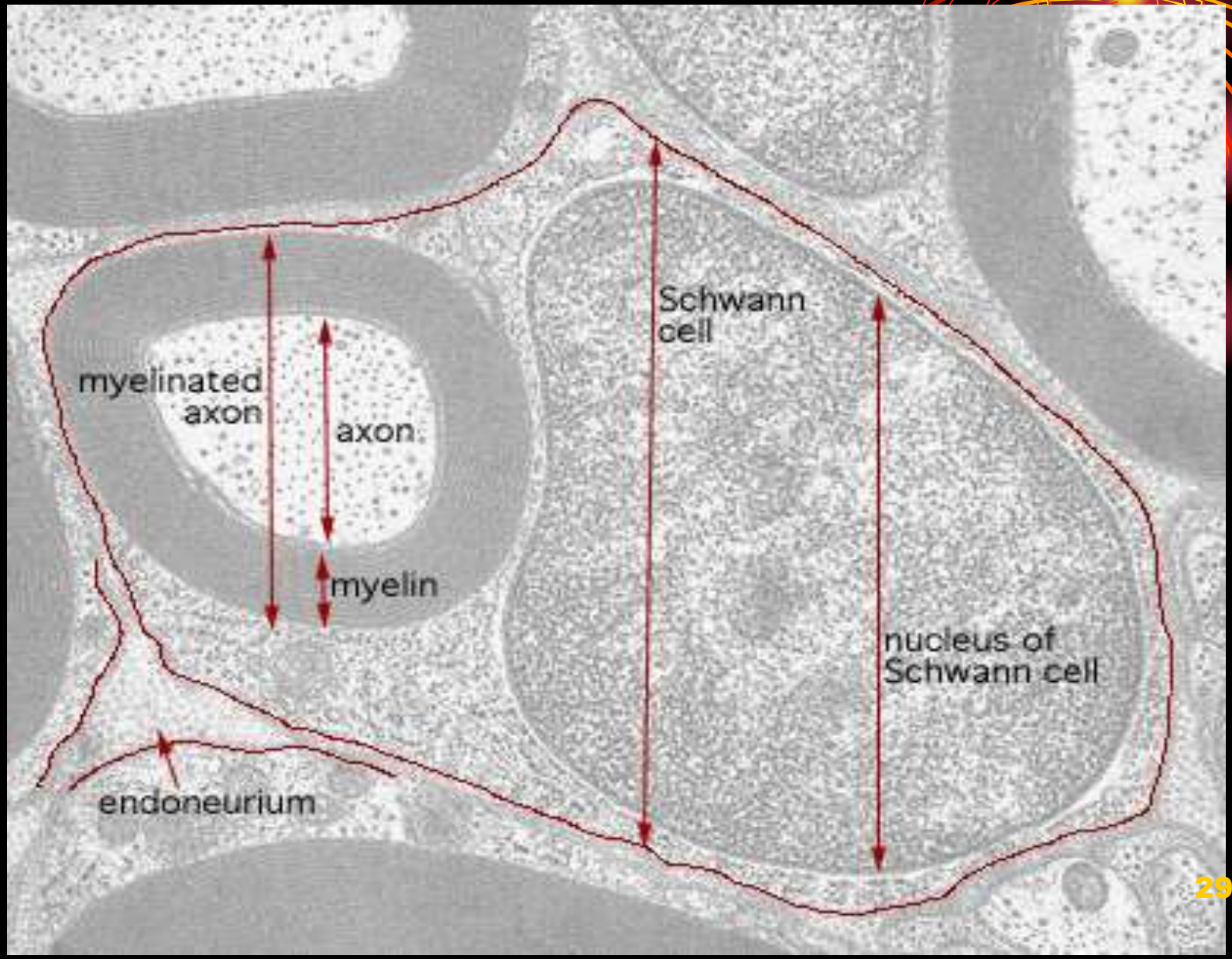
Sel penunjang PNS

- **Sel Schwann**
- **Sel satelit**

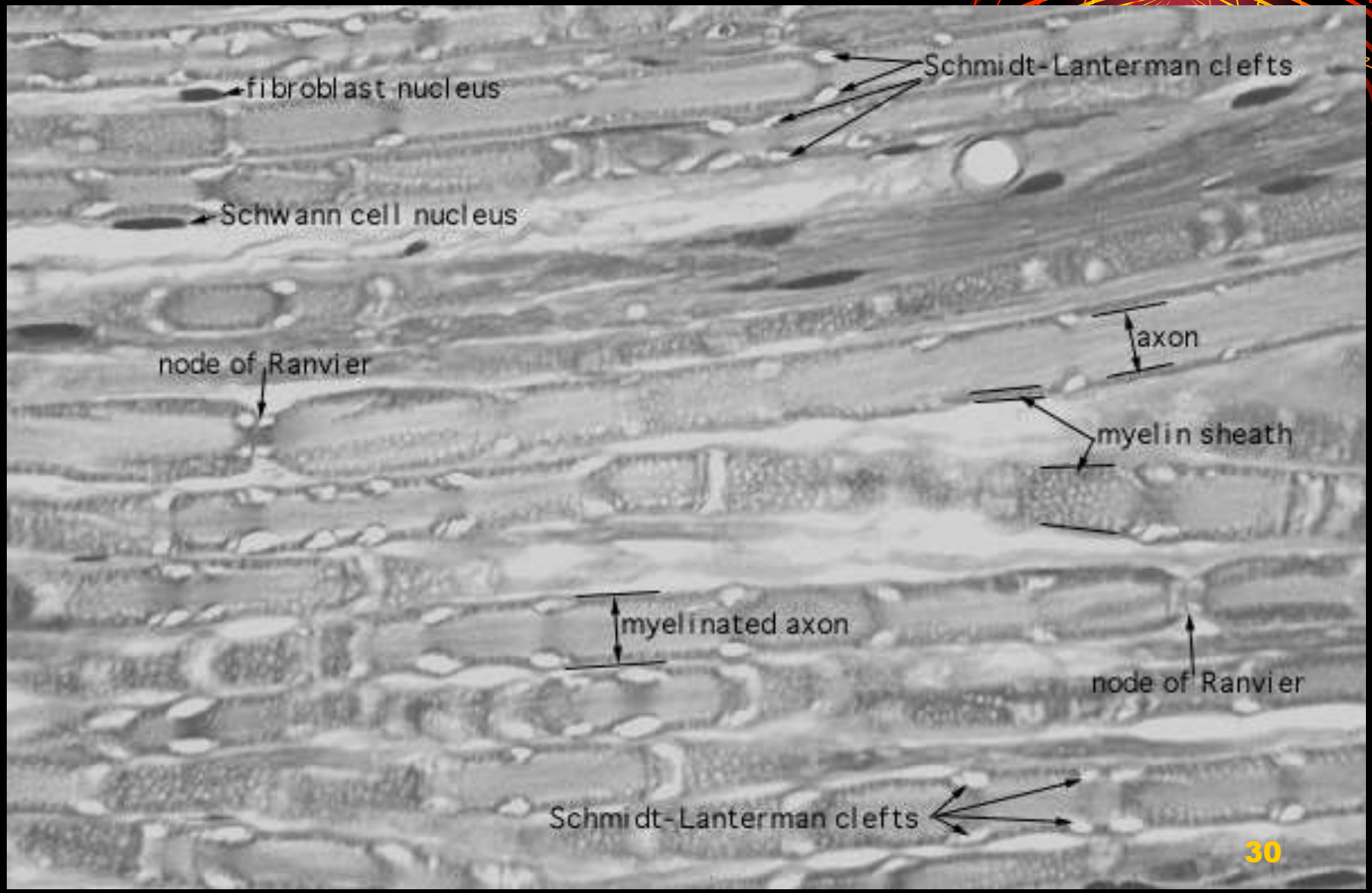
Sel Schwann

- Bentuk gepeng
- Membungkus axon neuron motoris (myelin + dan -)
- 1 sel schwann 1 axon
- 1 axon ribuan sel Schwann nodus Ranvier.

MYELINATED AXON & SCHWANN CELL



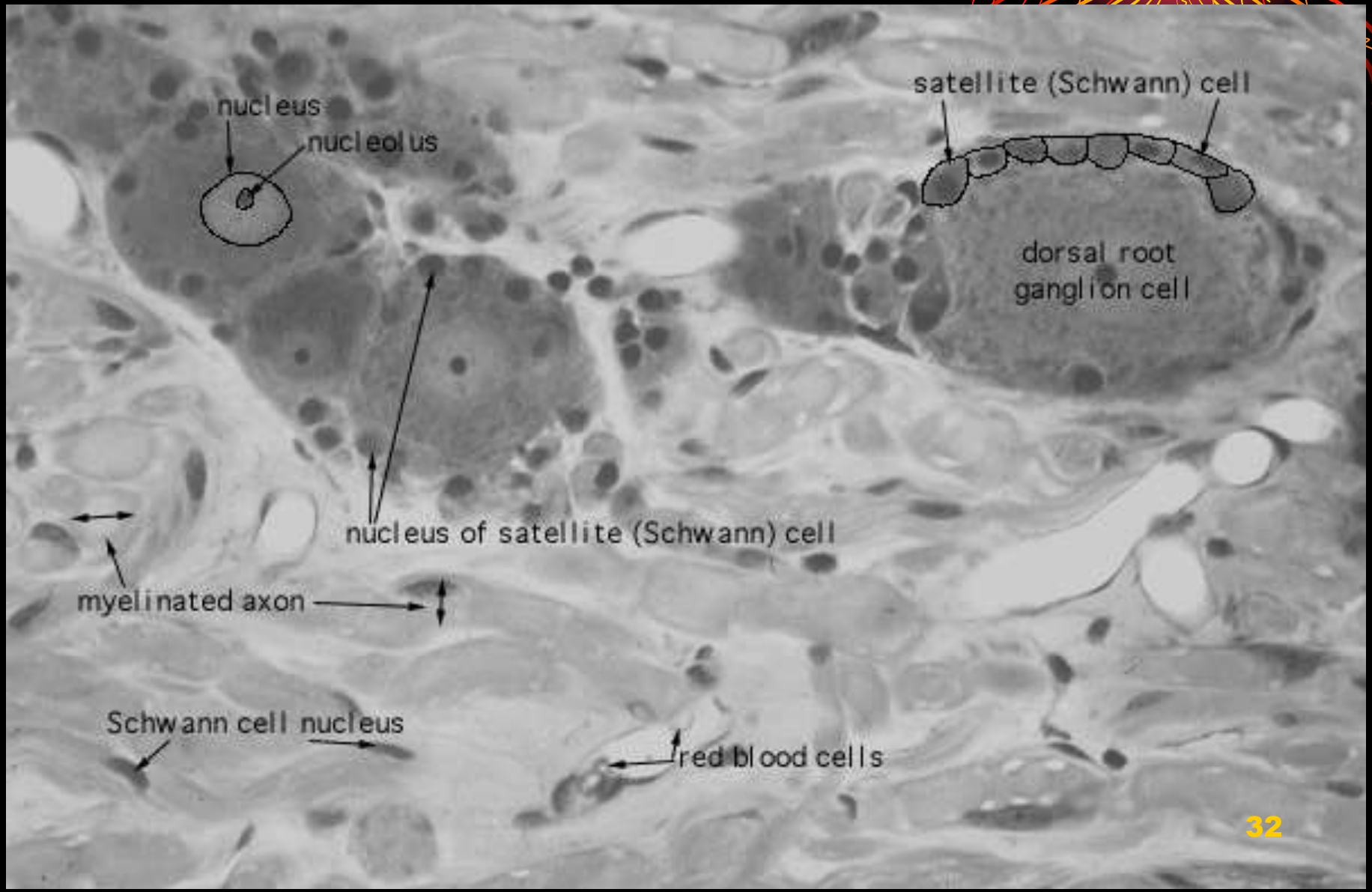
SCHWANN CELL



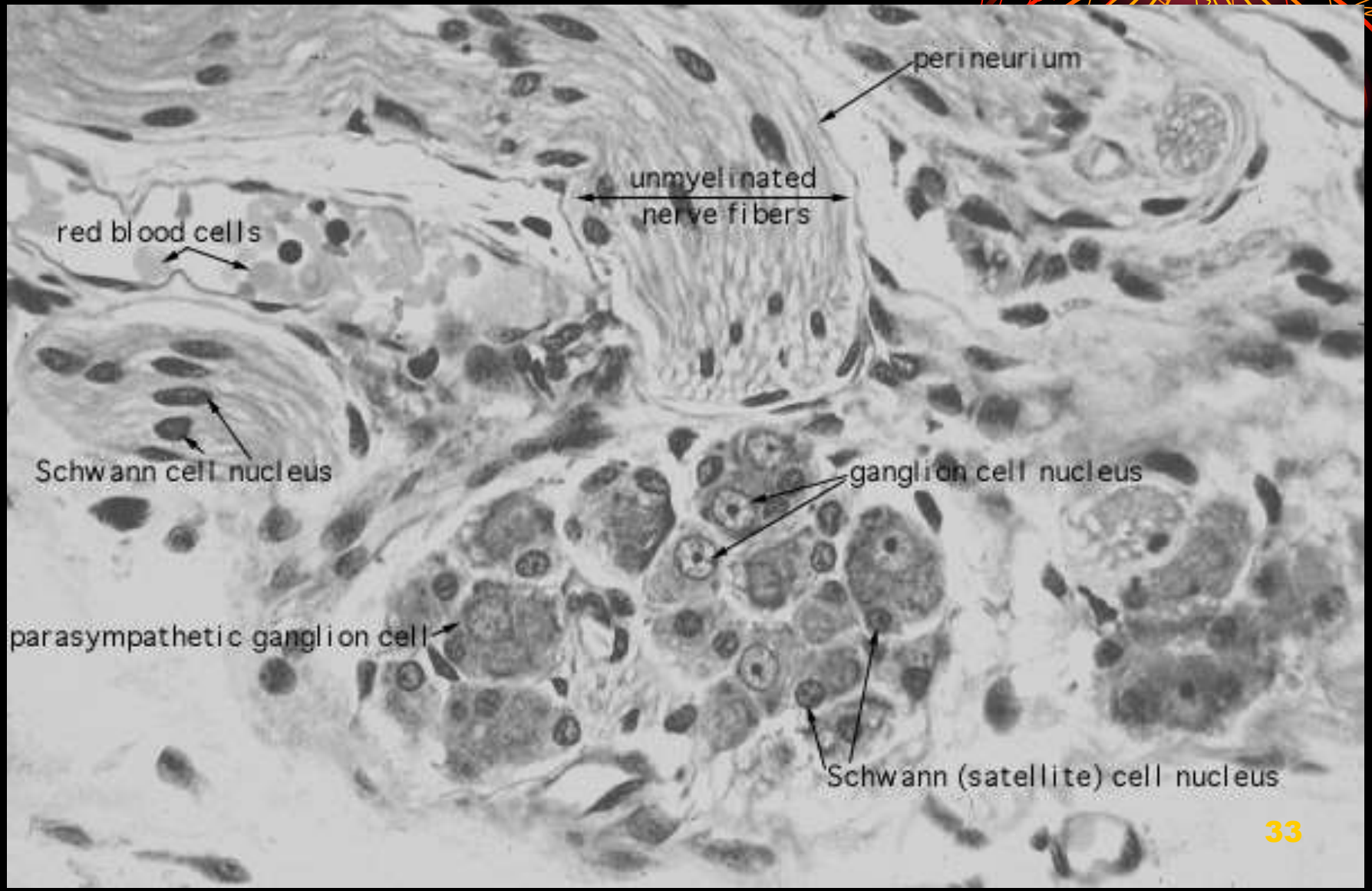
Sel Satelit

- Sel Schwann khusus
- Di ganglion → melapisi seluruh badan sel
- Inti bulat

SATELLITE (SCHWANN) CELL



SATELLITE (SCHWANN) CELL OF ANS



Serabut saraf

- Masing2 axon yang dibungkus selubung myelin (sel Schwann)
- Epineurium jaringan ikat padat fibbrosa luar
- Perineurium sel gepeng tight junction
- Endoneurium serat retikulin (dr sel Schwann)

saraf perifer

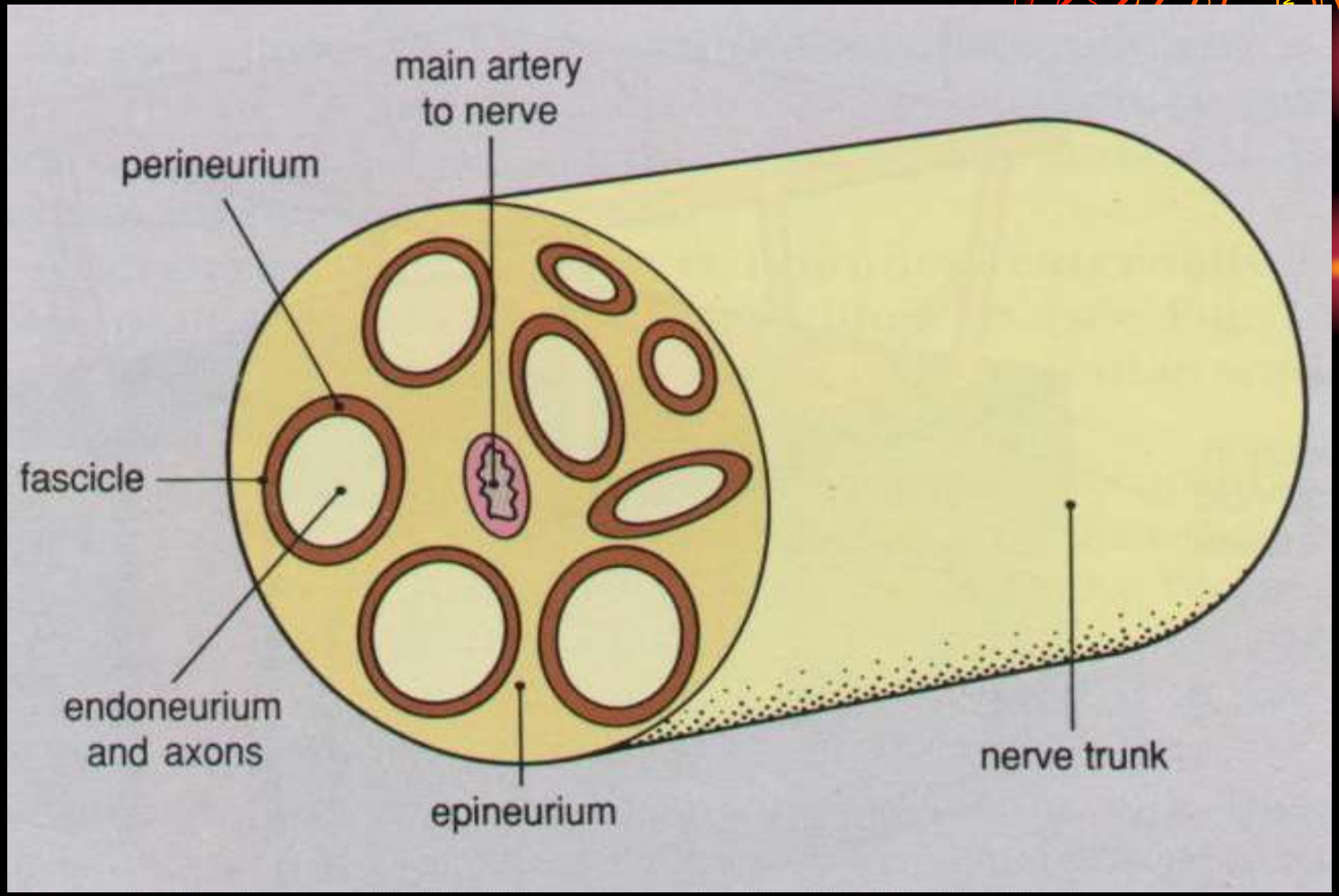
Di bungkus epineurium

- T.d kumpulan fasikulus →

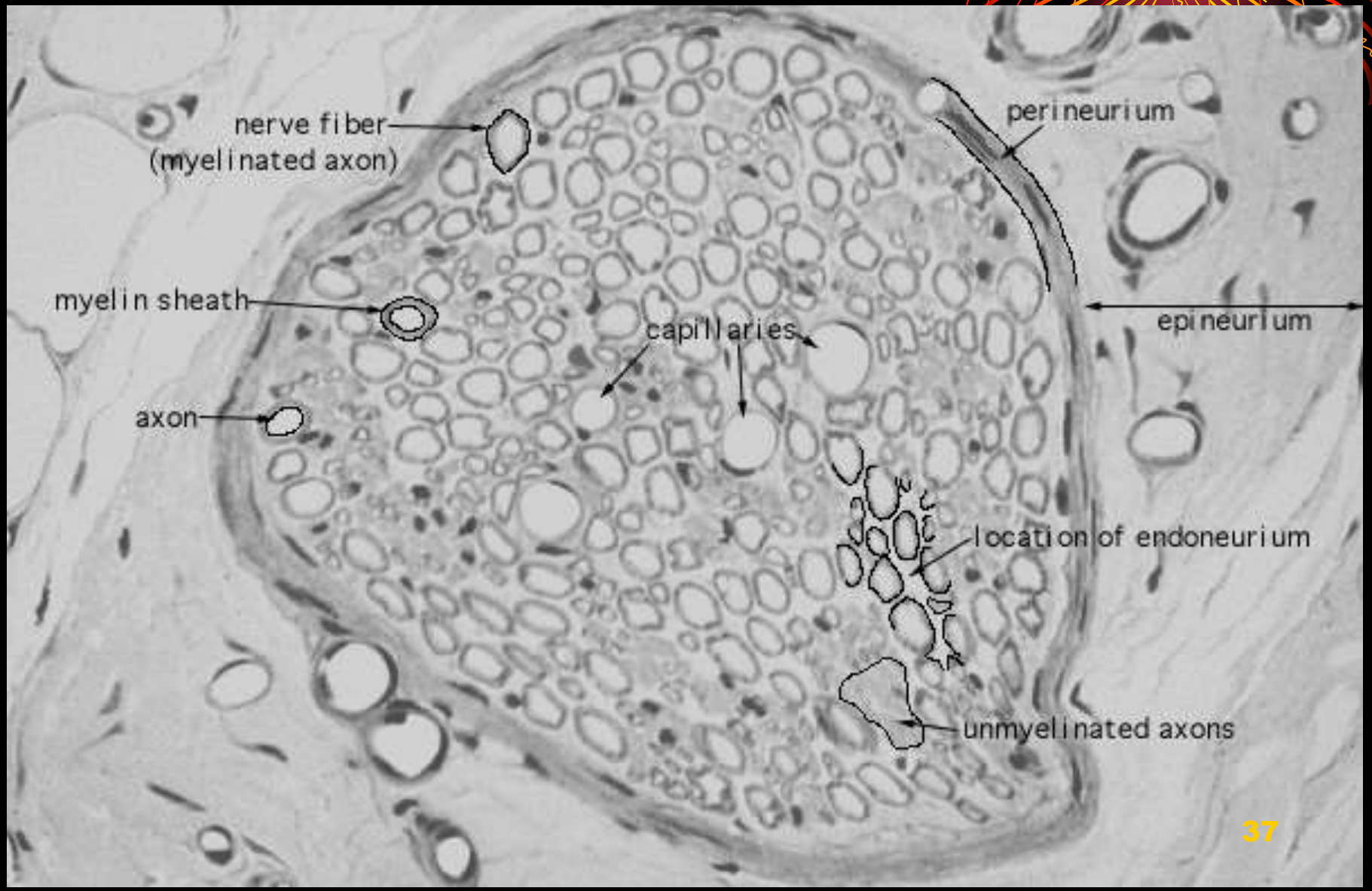
perineurium

- Serabut saraf → endoneurium

Support tissue of peripheral nerve



PERINEURIUM



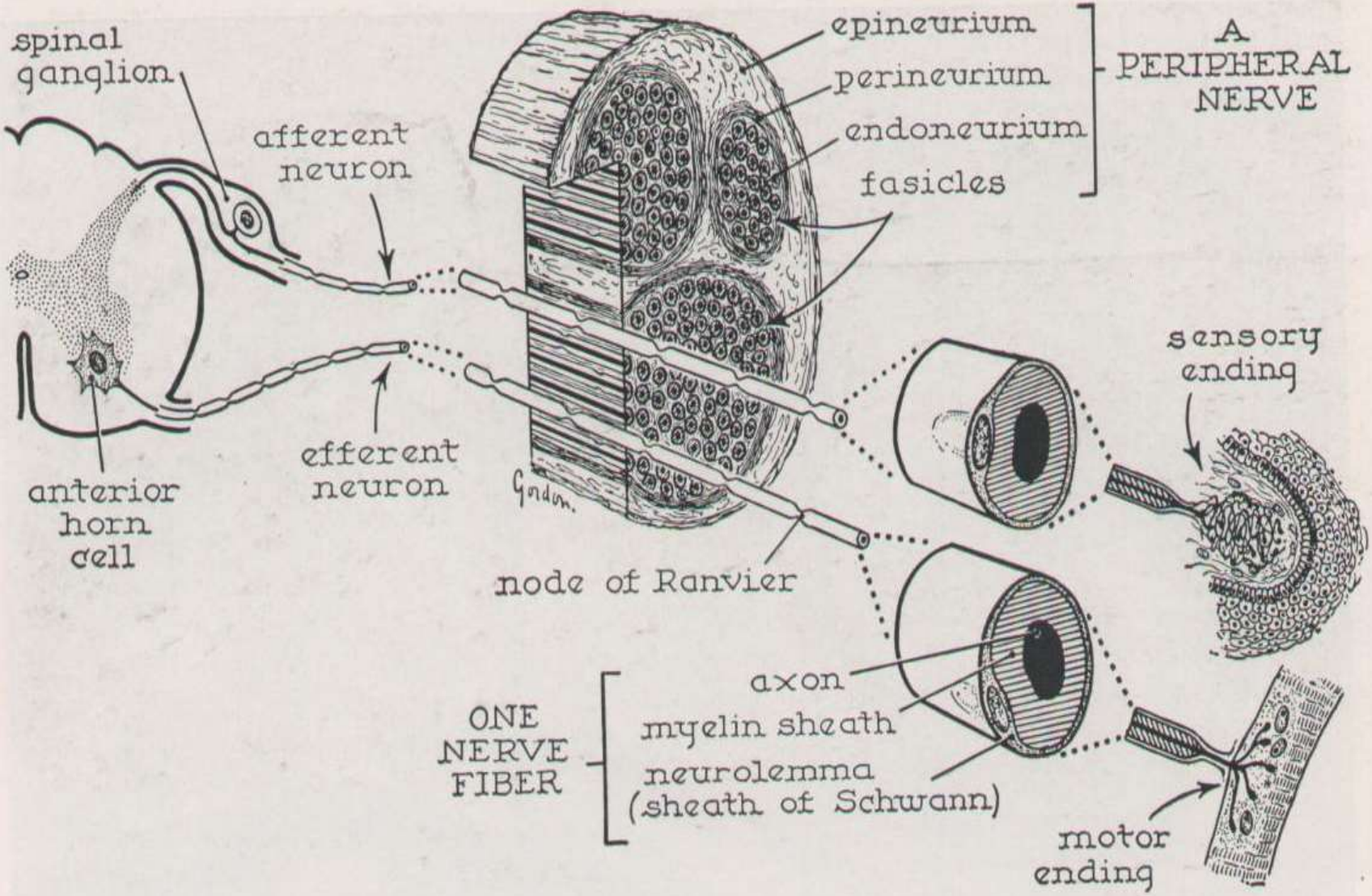


FIG. 318. Diagram showing the various parts of a sizable peripheral nerve.

GANGLIA

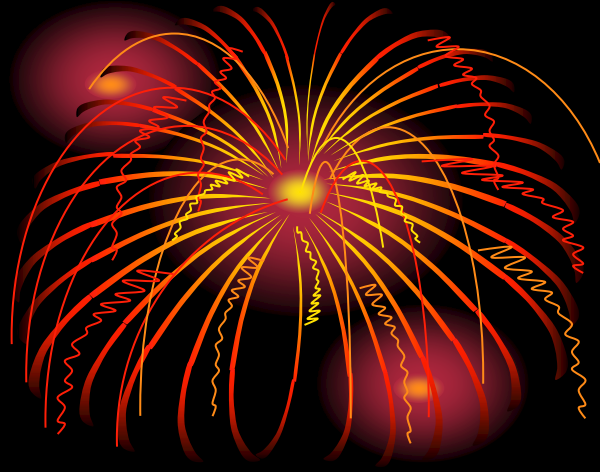
- Kumpulan berkapsul badan sel neuron di luar CNS.
- Ganglion otonom: ganglion motorik.
- Ganglion kraniospinalis: ganglion sensorik (sinaps -)

Ganglion

Dilapisi : - sel satelit
- sel kapsul

- Ganglion craniospinal
  - ' Neuron pseudounipolar
  - ' Sel satelit :
    - . lebih banyak dp ggl. Otonom
    - . inti > bulat
    - . mengelilingi seluruh badan sel neuron

Ganglion otonom



- **Neuron multipolar**

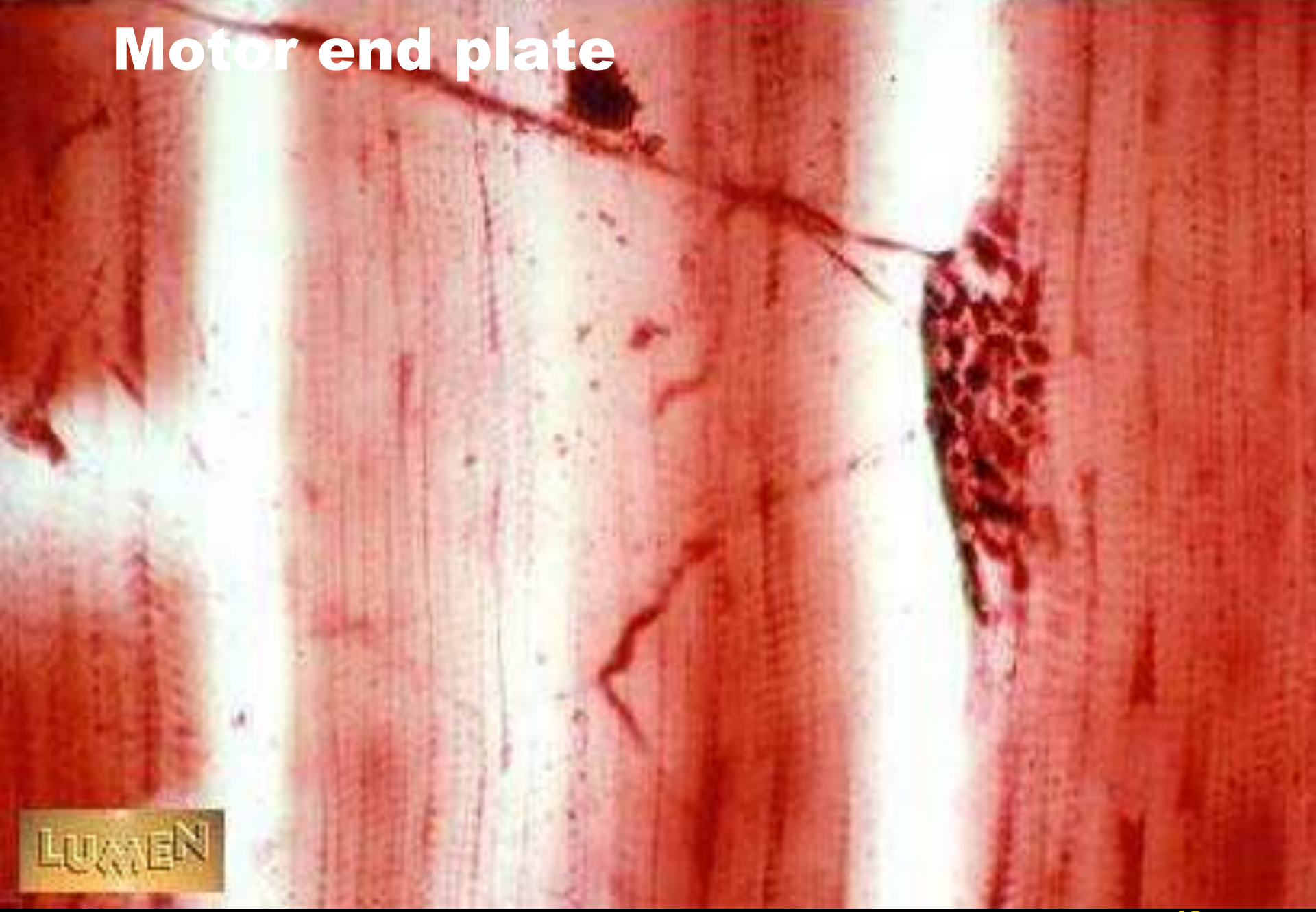
- **Sel satelit**
  - **> sedikit**
  - **inti > oval**
  - **membentuk lapisan terputus-putus di sekeliling badan sel neuron**

- **Letak : K simpatis : dekat CNS**
  K para simpatis : jauh dari CNS

Akhiran saraf

- **Akhiran saraf efferent utk somatis :**
  ' membentuk *motor end plate, ciri2nya:*
  - **myelin ser. saraf (-)**
  - **endoneur menyatu dg ser retikuler sarkolema**
  - **berbentuk bulbous**
  - **ser otot mencekung → dis. synaptic gutter**

Motor end plate



Akhiran saraf afferent bebas

Lokasi :

- semua jar epitel
- jar. Ikat & otot
- membrana serosa

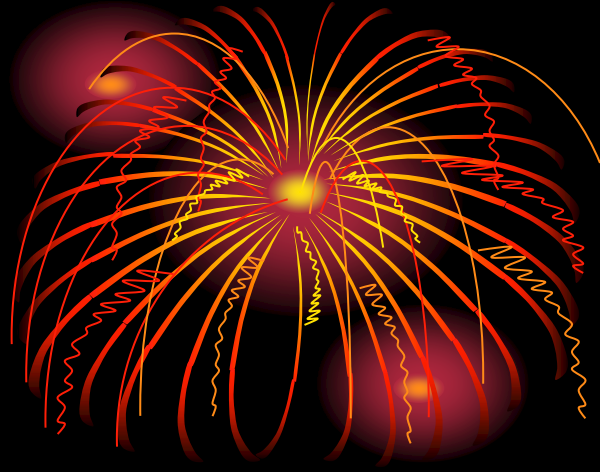
Jenis : sensoris

Rasa: nyeri

Akhiran saraf afferent berkapsul (sensoris)

- End Bulb
- Corpusculum Meissner
- Corpusculum vater Pacini
- Muscle spindle (otot-tendon)

End bulb



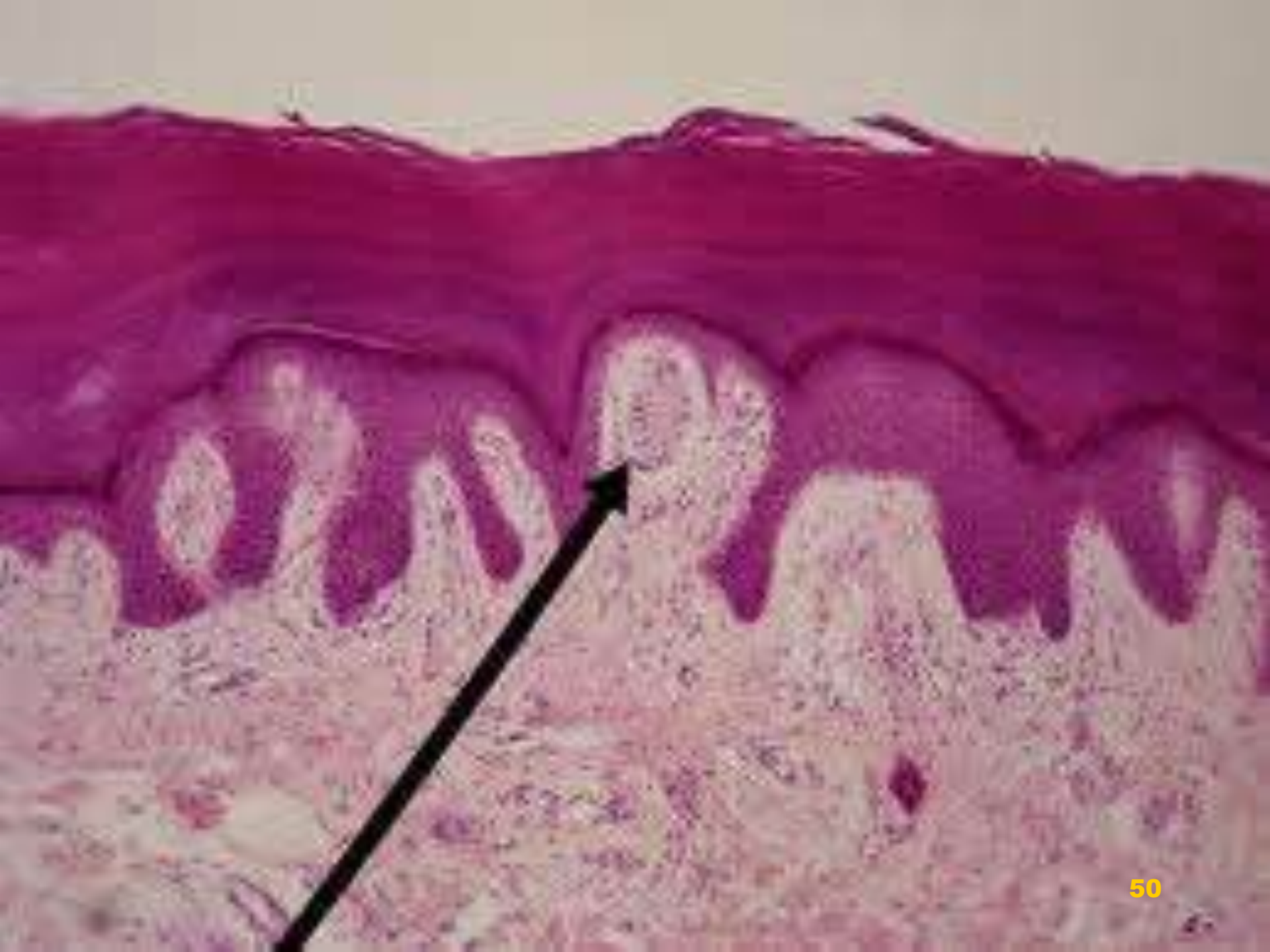
- **Bentuk : bulat/oval**
- **Kapsul td lamella2 mengelilingi inner bulb**
- **Contoh : end bulb of Krause di : conjunctiva, bibir, mukosa lidah, glans penis, clitoris**

Muscle spindle

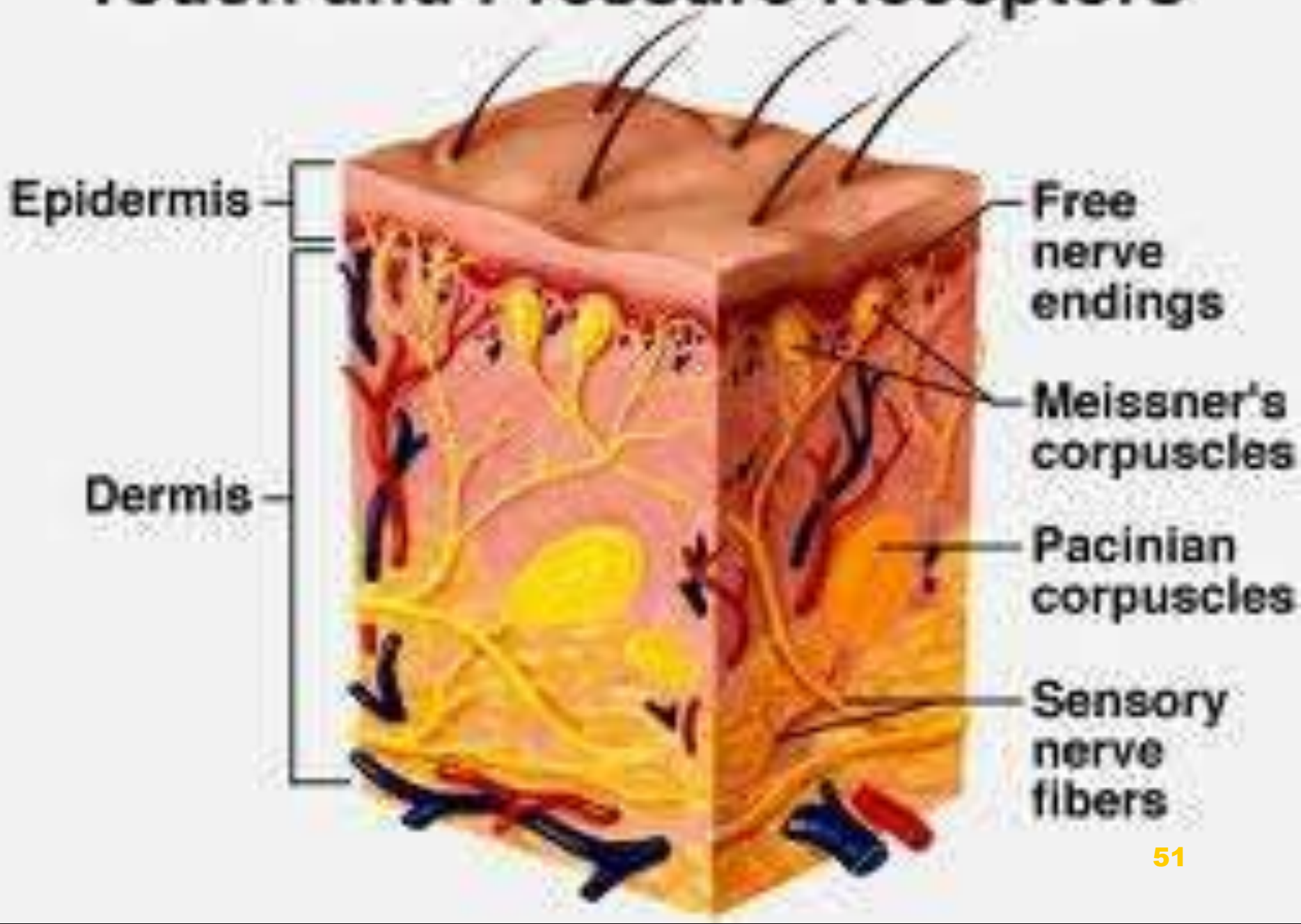
- Sensoris & kontrol kontraksi otot
- Lokasi otot rangka
- Berbentuk spindle dg isi :
  - ser. otot 1/>
  - ser saraf sensoris/motoris
  - pembuluh darah
  - jar. Ikat
- Dibungkus kapsul

Histology Lab Part 6: Slide 23

Muscle spindle



Touch and Pressure Receptors




wassalam