Unit - 1

→ The N. System help us to sense thing around us.

Neuron = Nerve cell = Basic building block of N. System.

↳ Helps in receiving, processing & transmitting information.

Cell body = Cyto. & Nucleus.

Dendrites = Extension that strech out of the cell.

Axon = Long thread like projection on the Neuron.

↳ Have insulated & protecting sheath called Myelin sheath → fat + protein

Axoplasm = Contain low conc. of Na^+ & high conc. of K^+ & negatively charged protein.

Dendrites

Nissl's granules

cell body

Nucleus

Schwann cell

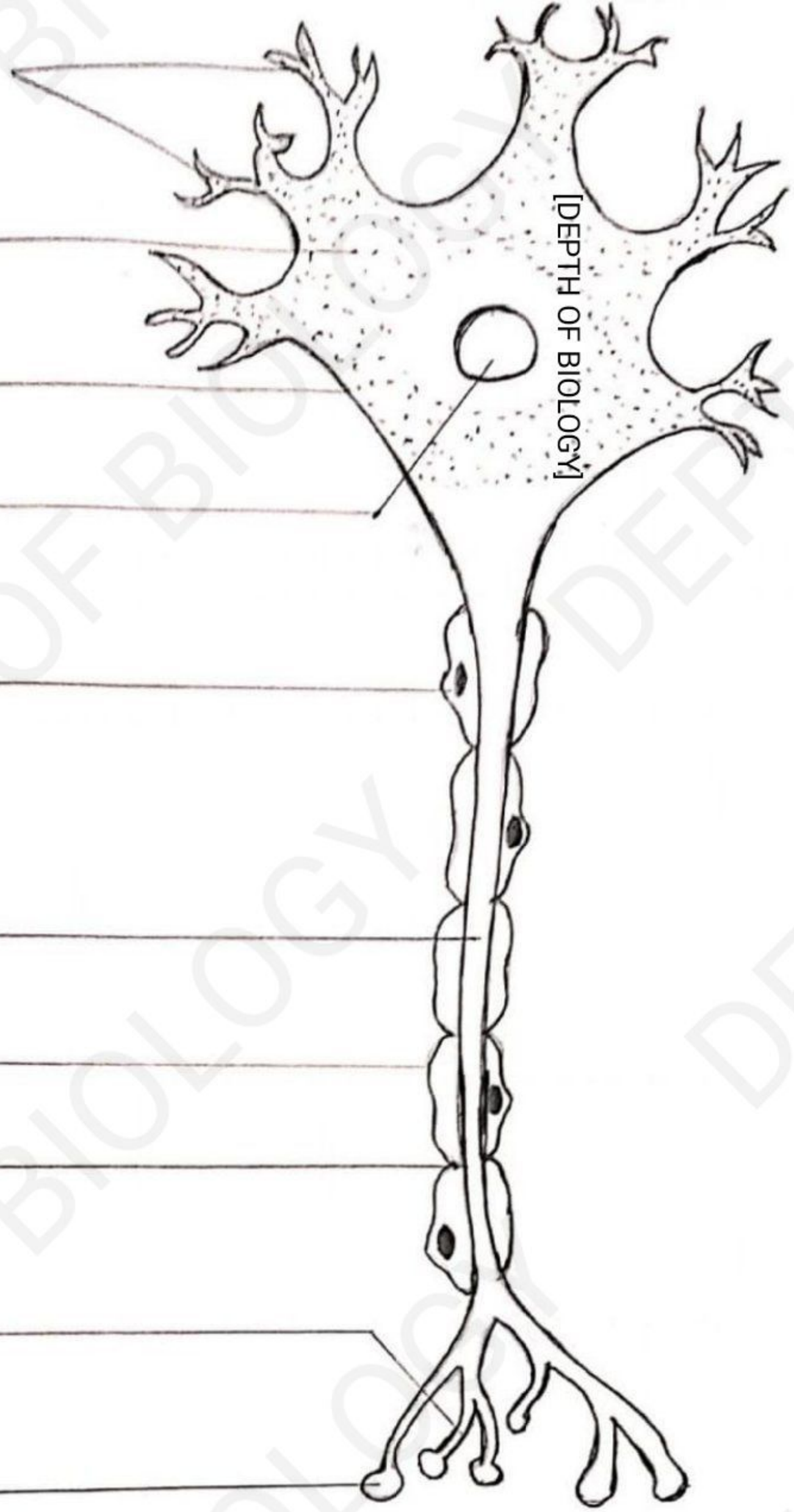
Axon

Myelin Sheath

Node of Ranvier

Axon terminal

Synaptic Knob



Neuron carry message in form of electrical signal called Nerve Impulse.

Dendrites = Pick up impulse from receptor & Pass it to the cell body.

↳ Impulse travel along the axon → Passes this impulse to another neuron

↓

Through a Junction called Synapse.

↓

Impulse carry from one neuron to another.

↓

Impulse finally delivered to the Brain or Spinal cord.

Synapse = Junction betⁿ Neuron & next Cell.

↳ Chemical release called = Neurotransmitter

Synaptic cleft = Space betⁿ presynaptic [20 nm wide] cleft & postsynaptic cell

Iˢᵗ nerve impulse comes in presynaptic cell.

↓

Ca^{++} ion in

↓

Neurotransmitter release into synaptic cleft by exocytosis.

↓

& binds to receptor of post synaptic membrane.

↓

Binding of Neurotransmitter.

↓

Trigger Na ion channel to open & pass the threshold potential.

↓

Now neurotransmitter broken down & removed from the synaptic cleft.

⇒ If not enough neurotransmitter binds to receptor.

↓

Then not enough Na flowing into the cell to reach the threshold potential.

↓

This means response.

Different type of Neurotransmitter [ACTH]

ACTH → Acetyl grp + choline grp
(Combine into post synaptic cell)

↓

Release into synaptic cleft.

↓

when ACTH binds into receptor ACTH

↓

It is rapidly broken down by
Acetylcholineestrase (enzyme found in synaptic cleft)

↓

Acetyl + Cholin = Both reabsorbed in presynaptic neuron & Combine again

↳ Basic unit of N. System

Detail of Neuron ⇒ Can Syntheris chemical energy (ATP) only from glucose.

↓

Mature neuron never divide. They do not undergo cell division.

cell body ⇒ It contain uni-nucleated cytoplasm.

↳ Centriole is absent.

↳ Some other organelle like Nissl's granules & neurofibril are also found in nerve cells.

↳ Except centriole all other organelle found in the cytoplasm.

ER coils around the ribosomes from granule like structure called Nissl's granules or Trigroid body

↓

Centre of protein Synthesis.

Cell process :—

ⓐ Dendron → Small cell process.

↳ It's fine branch called dendrites.

↳ Some receptors are found on it.

↳ It receive stimuli & produce centripetal conduction.

↳ It has Nissl's granule.

ⓑ Axon → Longest cell process

↳ Contain exoplasm.

↳ Covered by exolemma.

↳ Terminal end is branch in button shaped branch telodendria.

↳ Part from which axon arises Axon hillock.

Axon → Covered by layer of phospholipid which is called myelin sheath.

These are arrange along the length of axon.

consists of Schwann cell.

Neuroglia

Nerve | Glue

- Support, nurture & protect the Neuron & maintain homeostasis. of the fluid that bathed neuron.

- cells of N.S. that perform supportive function.
- Unlike neuron neuroglia can multiply & divide in mature Nervous system.

- Brain tumor commonly derived from glial (called gliomas).
- CNS & PNS have different cell in their fluid system.

Neuroglial cells :—

Neuroglia of CNS

1. Astrocyte
2. oligodendrocyte
3. Microglia
4. Epindymal cells

Neuroglia of PNS

1. Schwann cell
2. Satellite cell

Neuroglia :- That form myelin, protect, support & maintain equillibrium in your Nervous System are called glial cells. Commonly known as Neuroglia.

Glial cells :-

@ oligodendrocyte → Major type of glial cell in the brain include oligodendrocyte, microglia & smaller thenastrocyte, Round or oval cell body.

↳ Specialised with long process that wrap around axon of neuron to form Myelin sheath.

The myelin sheath acts like an electrical insulator around a wire.

↓

It helps to speed up the electrical signals that travel down an axon.

↓

Without oligodendrocyte an action potential would propagate 30 times.

(b) Microglia ⟶ Special macrophage found only in the CNS.

↳ Small cell with few process.

↳ They wander through the brain tissue, phagocytizing dead, injured cells & foreign invaders, derived from monocyte. [DEPTH OF BIOLOGY]

↳ High Conc. of microglia are an indication of Infection, trauma or Stroke.

[DEPTH OF BIOLOGY]

(c) Astrocytes ⟶ Most abundant & functionally diverse glia.

↳ Star Shaped glial cell provide Supportive framework to hold neuron in place.

Electrophysiology :— Neuronal electrophysiology is the Study of electrical Properties of biological cells & tissue within the nervous System.

[DEPTH OF BIOLOGY]

With the help of neuronal electrophysiology doctor & Specialist can determine how neuronal disorder happen.

Action potential

Step-1	Threshold Stimulus to -55 mv	Stimulus
Step-2	At +30 mv, Na channels close & K ions channels open	K ions
Step-3	K floods out of the cell	out of cell
Step-4	Hyperpolarization to -90 mv	Hyper
Step-5	K channels close and tge resting potential is re-established at -70	Re-established

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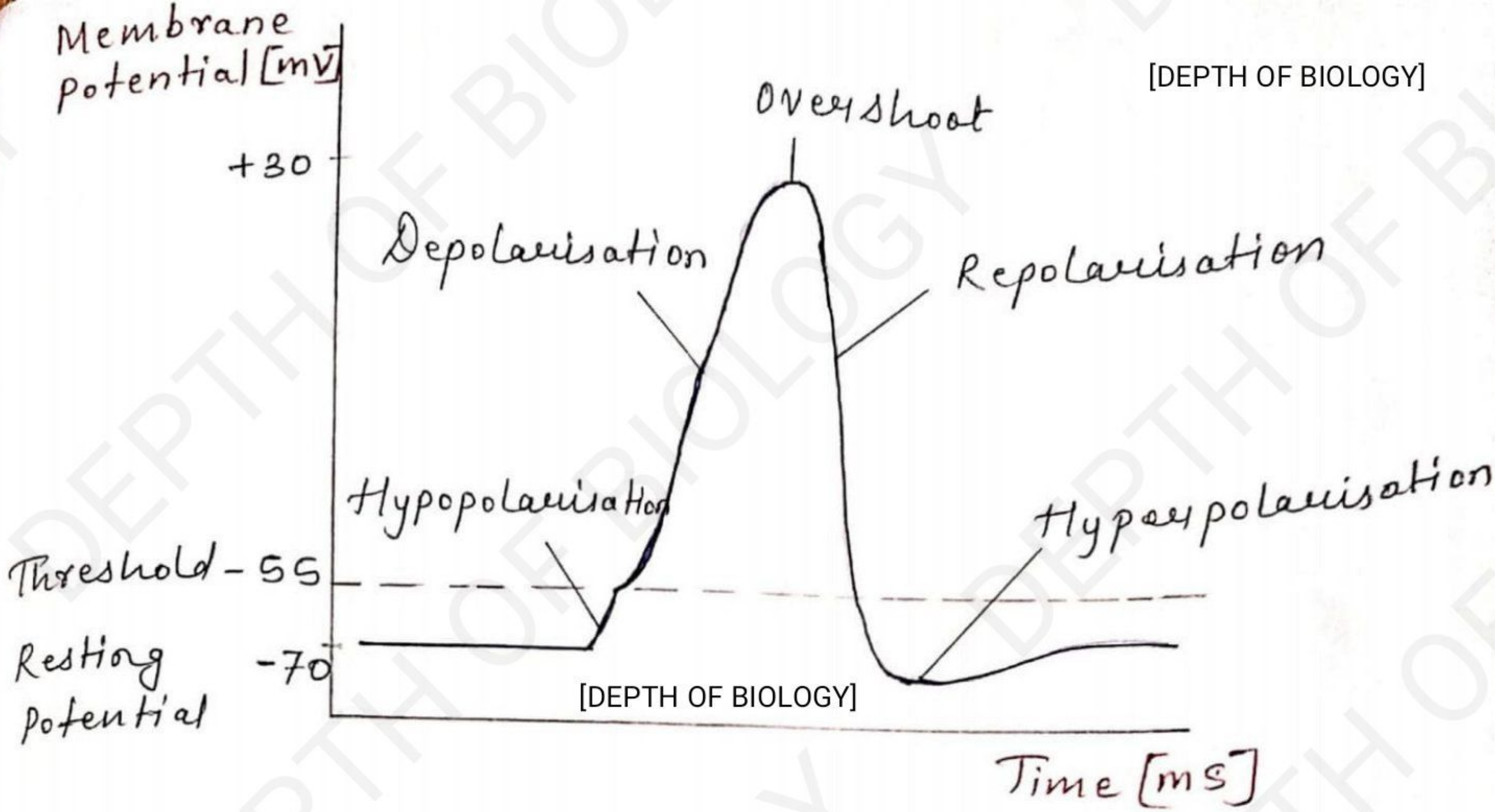

Properties of nerve fibre :—
Link in description.