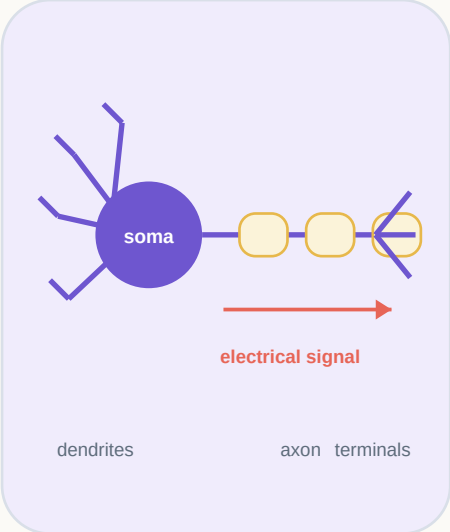
AP PSYCHOLOGY | UNIT 1

TOPIC 1.3

The Neuron and Neural Firing

Neurons turn stimulation into electrical impulses, then use chemical messengers to communicate across synapses.



THE CORE COMMUNICATION CHAIN

RECEIVE → dendrites detect

INTEGRATE → soma combines

FIRE → axon potential

RELEASE → chemical message

BY THE END, YOU SHOULD BE ABLE TO...

1. Trace information through the main parts of a neuron.
2. Explain threshold, action potential, all-or-none firing, and the refractory period.
3. Describe how neurotransmitters, hormones, and psychoactive drugs affect behavior.

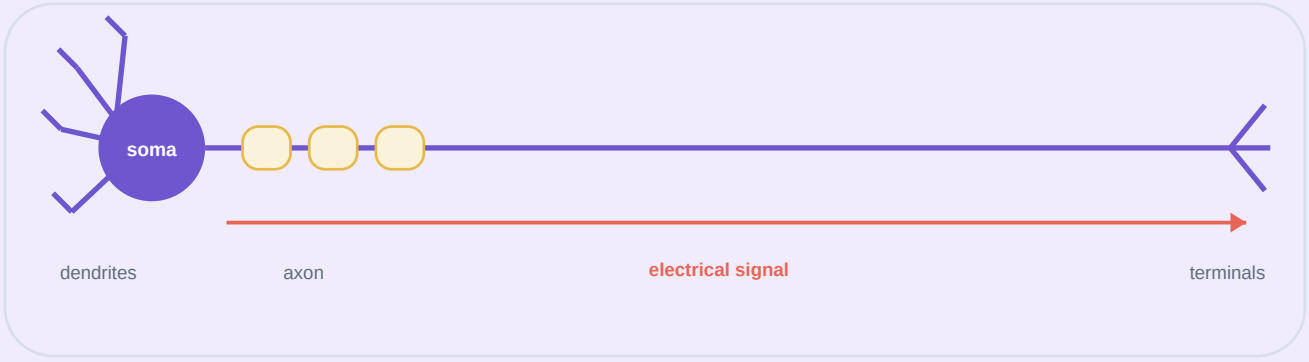
BIG IDEA

Within a neuron, the message is electrical. Between neurons, the message is chemical. Communication depends on both stages.

1 Build the signal, then fire

Connect each structure with its job and each firing stage with its sequence.

NEURON STRUCTURE



Dendrites
receive input

Soma
integrates signals

Axon + myelin
carry and speed impulse

Terminals
release neurotransmitter

ACTION POTENTIAL SEQUENCE

1. **RESTING** — inside is relatively negative
2. **THRESHOLD** — minimum stimulation reached
3. **DEPOLARIZE** — action potential travels
4. **REFRACTORY** — cell resets before refiring

ALL-OR-NONE

Once threshold is reached, the neuron fires fully. A stronger stimulus changes firing rate, not the size of one action potential.

GLIAL SUPPORT

Glial cells provide structure, insulation, communication support, and waste transport that help neurons function.

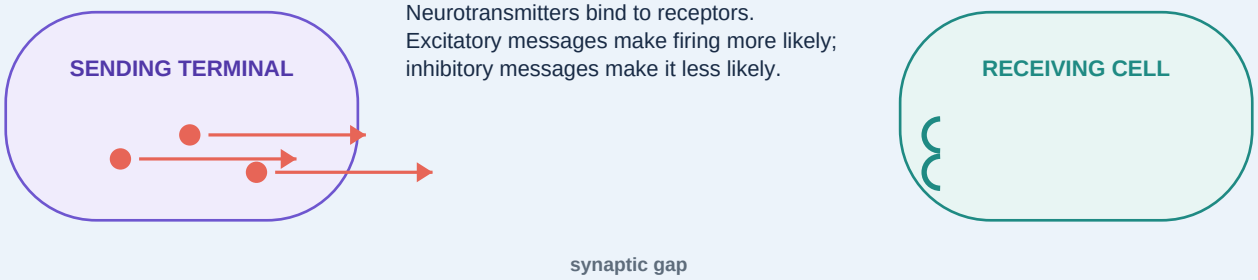
REFLEX ARC

Sensory neuron -> interneuron in the CNS -> motor neuron. This short pathway allows a fast protective response.

2 Cross the synapse chemically

After electrical firing reaches the terminal, neurotransmitters carry the message to the next cell.

SYNAPTIC TRANSMISSION



HOW DRUGS CHANGE THE MESSAGE

Drug action	Effect at the synapse	Result
Agonist	mimics or increases transmitter activity	signal is strengthened
Antagonist	blocks or reduces transmitter activity	signal is weakened
Reuptake inhibitor	slows reabsorption into the sending cell	transmitter remains longer

NEUROTRANSMITTERS

Fast, targeted chemical messages released by neurons across synapses.

HORMONES

Chemical messengers released into the bloodstream; often slower and longer-lasting.

REMEMBER

Behavior can change when neural firing, receptor binding, neurotransmitter availability, or hormone activity changes.