

Module 2.2



The Nervous System



As a Young Psychologist, I will be able to...

- **Understand the structure of a Nerve Cell**
- **Analyze Neurotransmitters**
- **Construct parts of the human nervous system**
- **Describe the importance of the Endocrine System & Hormones on our systems**

Is that just nerves or my Nervous System?

Santiago Ramon y Cajal (1887)- Proposed the idea that our nervous system is made up of individual cells

But what makes up a cell????



Parts of a Cell!

1. The Nucleus !

The oval shaped membrane-bound structure found in the **soma** or body of the neuron



Parts of a Cell!

2. Dendrites!

The “tree-like” arms of a cell.

They receive chemical signals from other neurons & transmit them into the cell

Nucleus



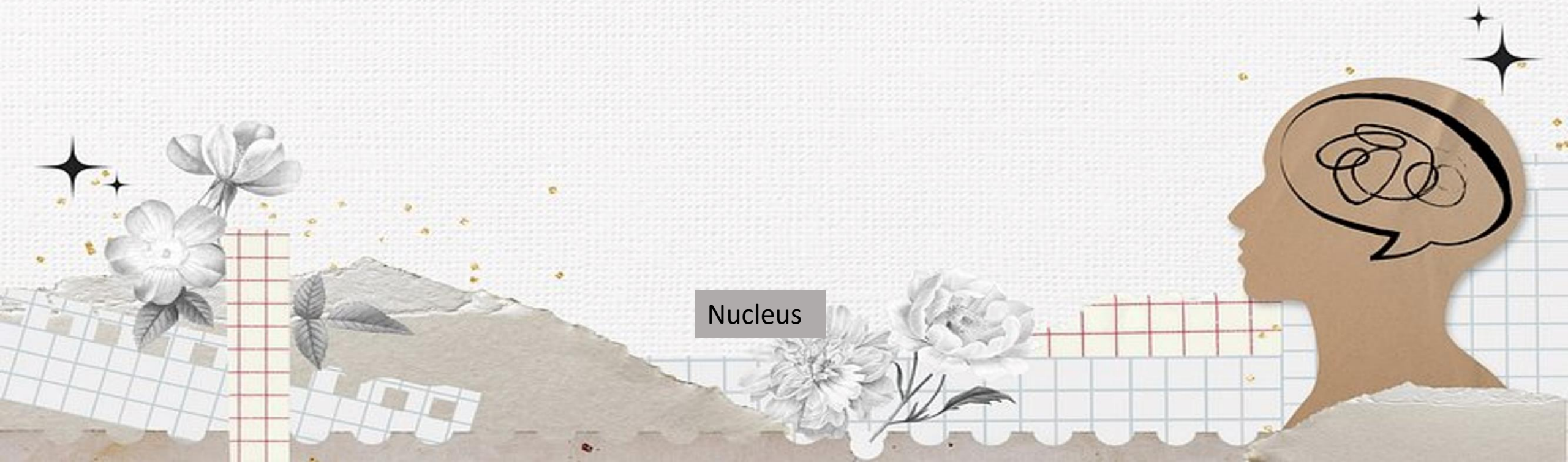
Parts of a Cell!

3. The Cell Body!

The structure that “holds”
the cell together!

Dendrites

Nucleus



Parts of a Cell!

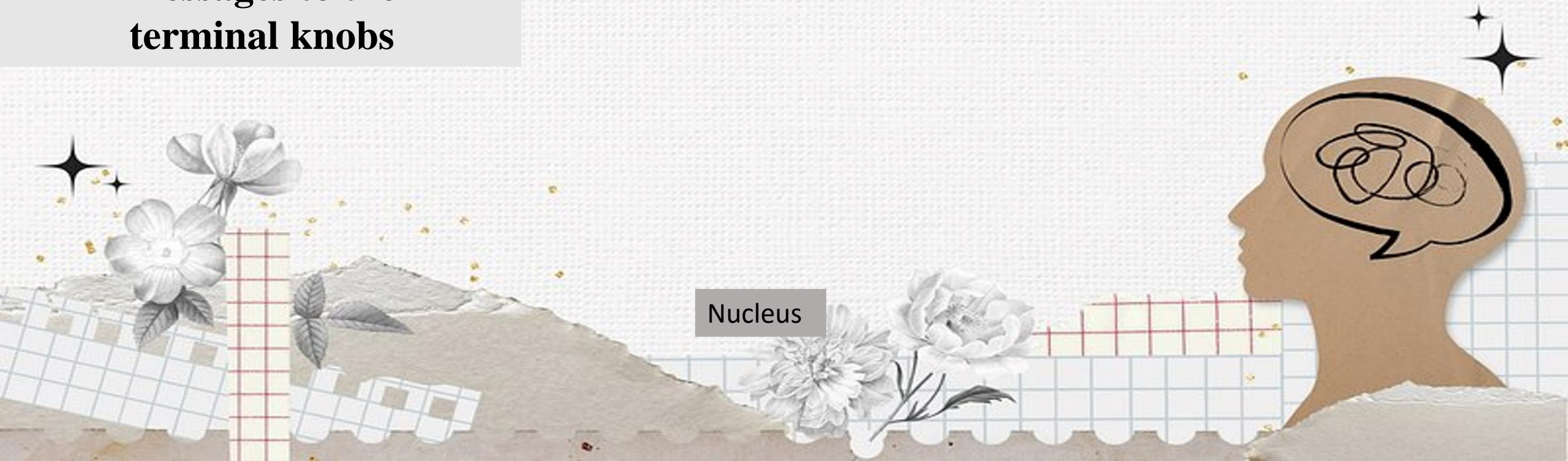
4. Myelin!

**The fatty substance
attached to the soma
& carries electrical
messages to the
terminal knobs**

Dendrites

Cell Body

Nucleus



Parts of a Cell!

5. Node of Ranvier

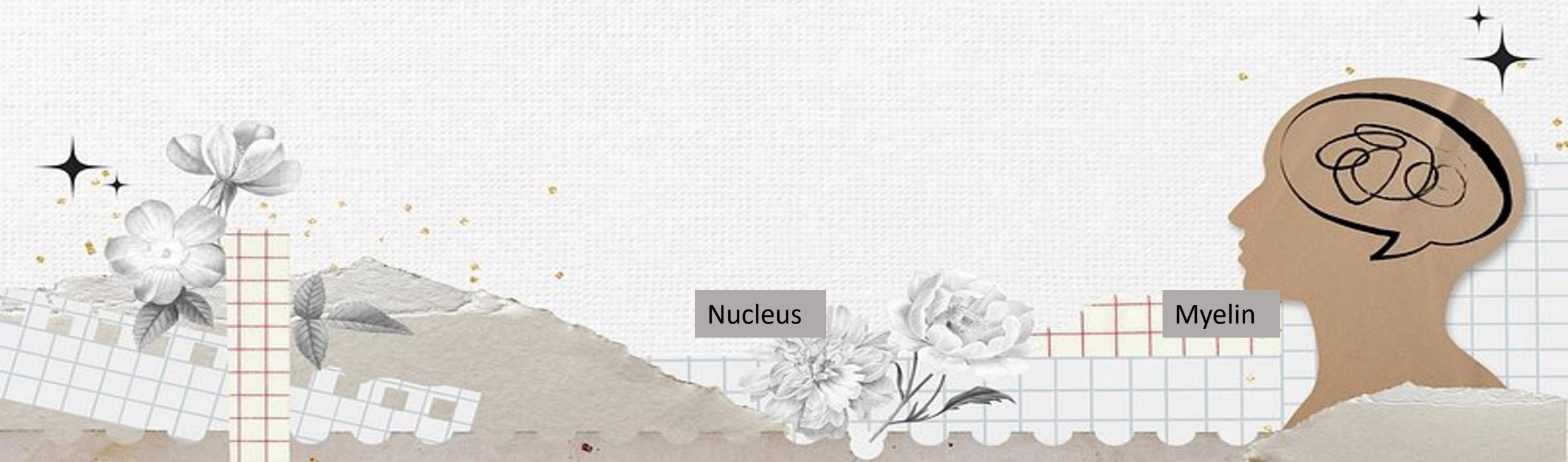
serves to facilitate the rapid
conduction of nerve
impulses

Dendrites

Cell Body

Nucleus

Myelin



Parts of a Cell!

6. Axon Terminal

The carriers of the neural message to “broadcast” messages to other cells

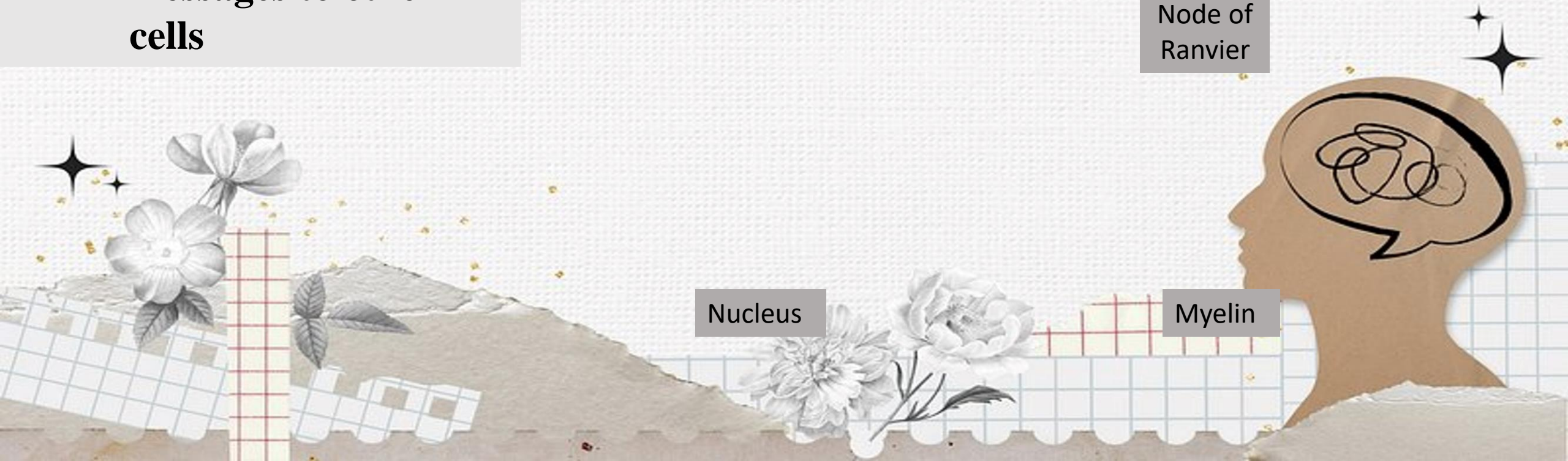
Dendrites

Cell Body

Node of Ranvier

Nucleus

Myelin



Parts of a Cell!

7. Schwann Cell

Oversee the maintenance & regeneration of the motor and sensory neurons

Dendrites

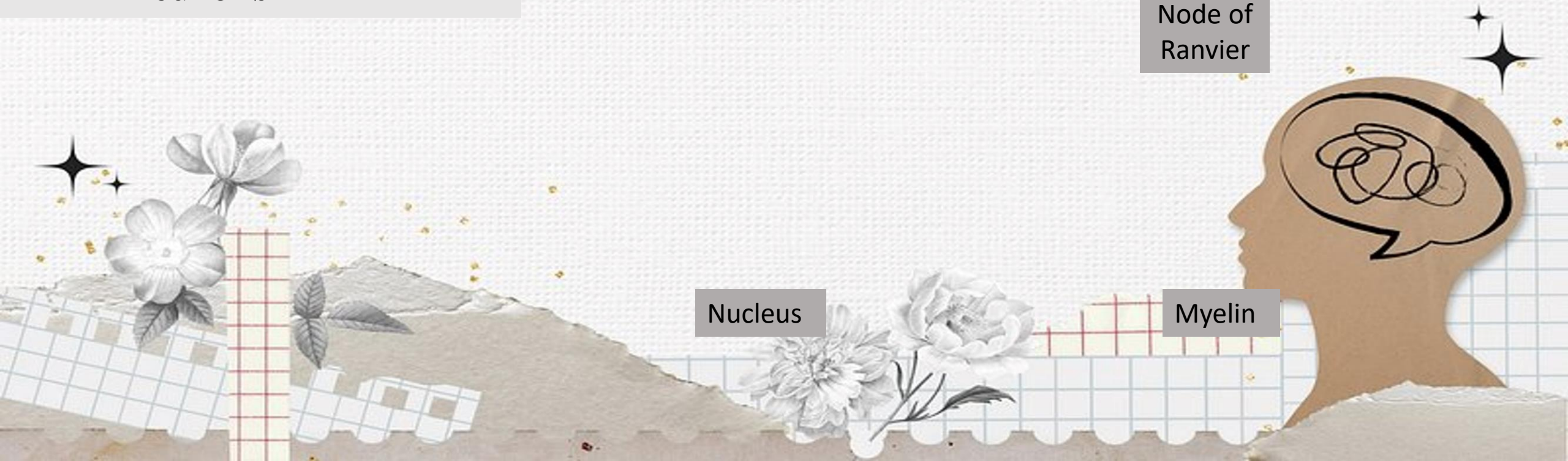
Axon Terminals

Cell Body

Node of
Ranvier

Nucleus

Myelin

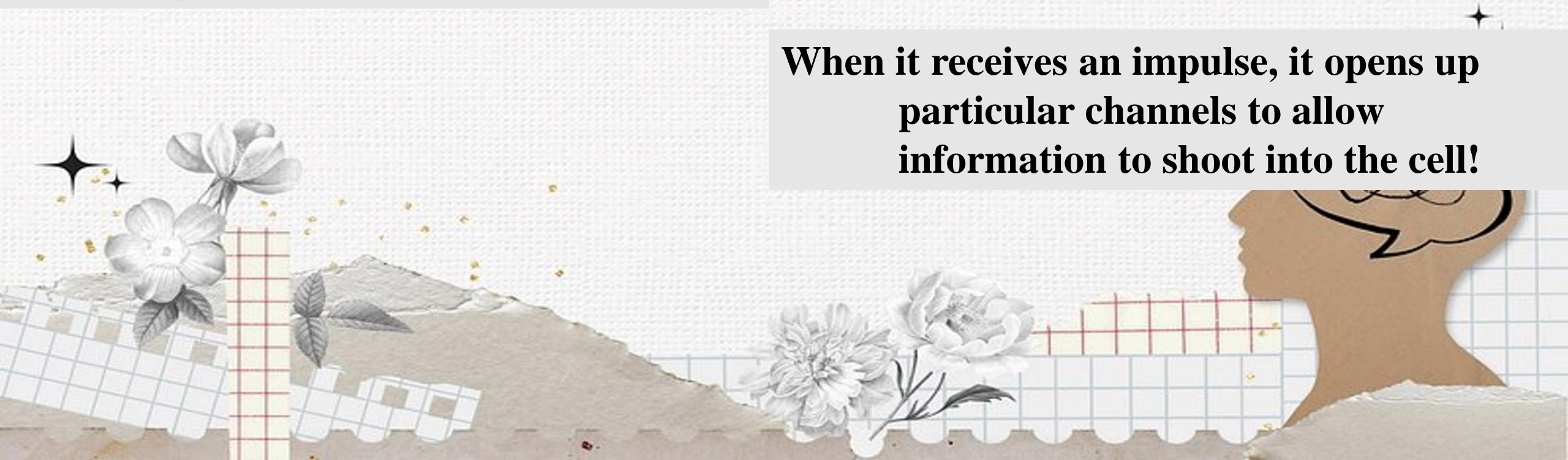


The Neural Impulse

Neurons are electrically charged with ions!

When a cell is resting it has resting potential! It's waiting for an impulse

When it receives an impulse, it opens up particular channels to allow information to shoot into the cell!



Neurotransmission

This is when a signal reaches the axon terminals

Each cell has Synapse between them-microscopic fluid that allows “information” to flow

A neuron has receptor sites that only allow certain neurotransmitters in.

Each neurotransmitter has a different function!



Acetylcholine!

Sends messages that deal with arousal, attention, memory, & muscle actions!

BEWARE OF AGONIST! It's a chemical that mimics or enhances effects of a neurotransmitter (Black Widow Bite)



Norepinephrine

**Involved in arousal &
mood! Deals with
your heart rate!**



Dopamine!

**Controls your movement &
sensations of pleasure!**



Serotonin!

**Deals with your sleep cycle, mood,
anxiety, & appetite**



Endorphins

Pain Relief & neural regulators!





The Major Divisions of the Human Nervous System

What is the Central Nervous System?

It's your Brain & Spinal cord!

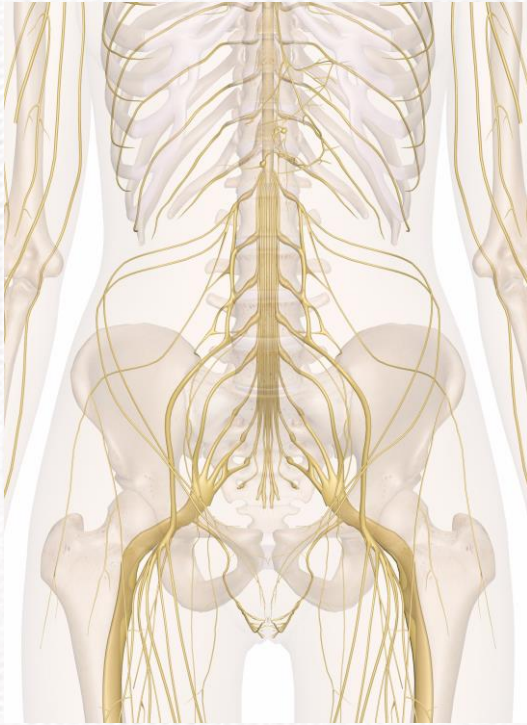


The Brain!

The core of the nervous system!

**Makes sense of information from senses,
makes decisions, & sends out
commands!**





The Spinal Cord

The long bundle of neurons down your back! The message “pipeline”!

The outer section carries information to the brain!

The interior carries information away!



Important Spine Terms!

Afferent Neurons- carry messages **TO** the spinal cord (think access)

Efferent Neurons- Carry messages **AWAY** to the muscles & glands (think exit)



Interneurons- neurons that connect the first two!

The Peripheral Nervous System

Transmits information to & from the central nervous system

*****think of it as little roads that connect to the highway!**



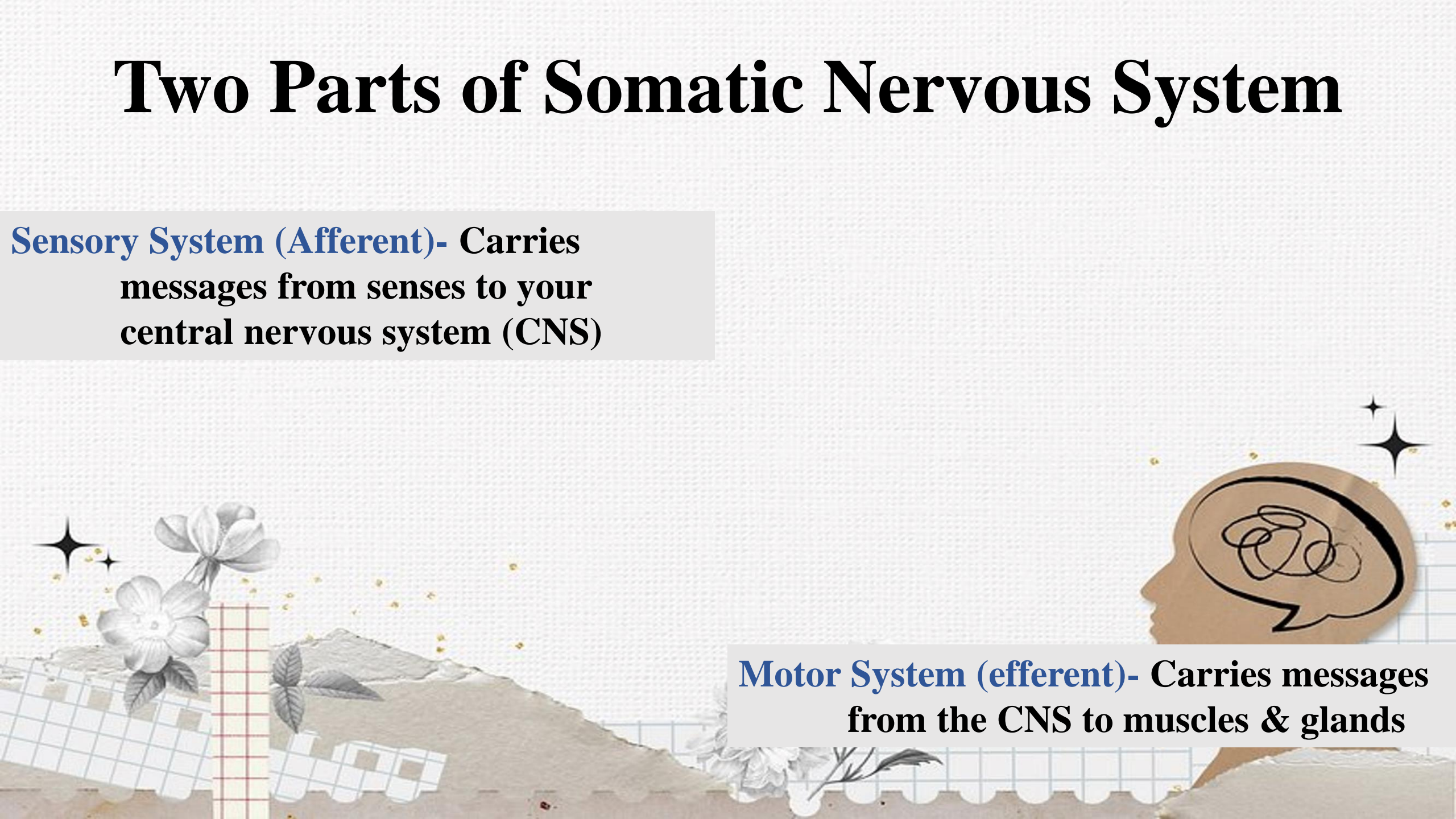
The Somatic Nervous System!

**Carries sensory information & controls
your skeletal muscles!**



Two Parts of Somatic Nervous System

Sensory System (Afferent)- Carries messages from senses to your central nervous system (CNS)



Motor System (efferent)- Carries messages from the CNS to muscles & glands

The Autonomic Nervous System!

Regulates your organs, blood vessels, pupils, digestion, etc. without you thinking!



Two parts of the Autonomic System!

Parasympathetic Division- Maintains body functions under ordinary conditions



Sympathetic Division- Prepares the body to react & expend energy in times of Stress



The Endocrine System!!!

What is the Endocrine System?

All of your glands that secrete hormones!



What are all of our glands and what do they do????

GREAT QUESTION!!!

The Pituitary Gland

Located in your brain! It controls all other glands in your body!

One of the most important is your growth hormone!



The Pineal Gland

The gland that releases melatonin- a chemical that tracks time length & seasons!



The Thyroid Gland!

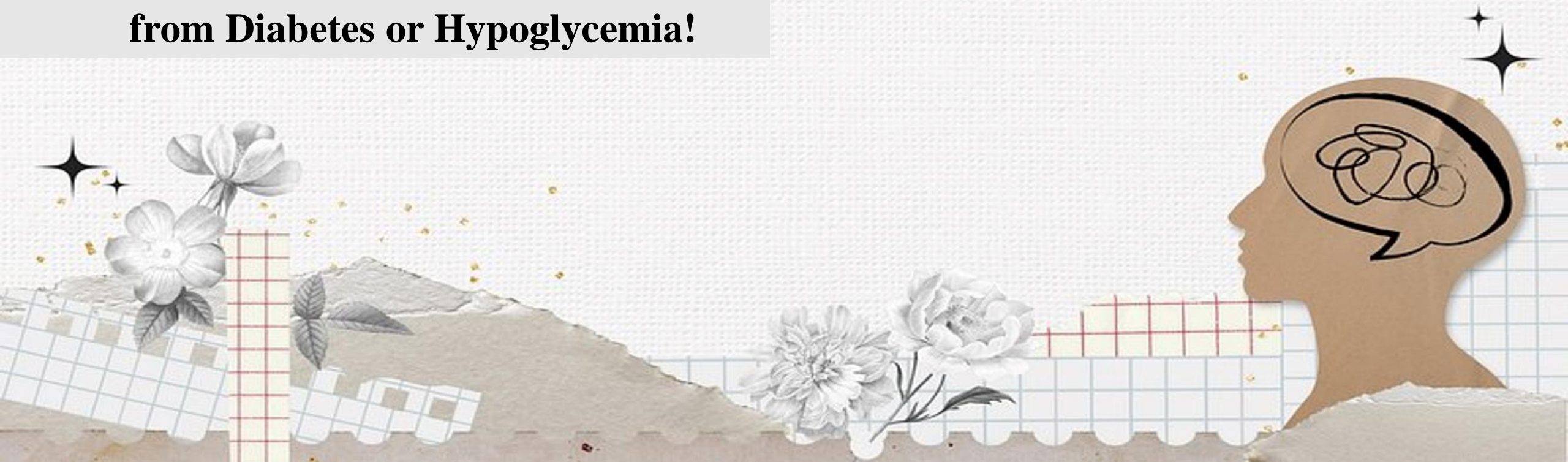
In your neck! This regulates growth & metabolism with the thyroxin hormone!



Pancreas

This controls the level of blood sugar in our bodies by insulin!

Too little or too much? You could suffer from Diabetes or Hypoglycemia!



The Gonads

The sex glands. Ovaries in females & testes in male!



The Adrenal glands!

Over our kidneys! They control stress!



The General Adaptation Syndrome

Developed by Hans Selye, discovered the sequence of reactions a body goes through during stress!

1. ALARM- A burst of energy & increased heart rate!

2. RESISTANCE- Body tries to relax & fight off stress

3. EXHAUSTION- When the body uses up resources (this can lead to serious health issues)



Big Health Problems from Hormones!

Heart Disease- Stress increases this & puts danger on your liver!



Cancer- Hormones tell cells not to stop dividing so they create tumors!