

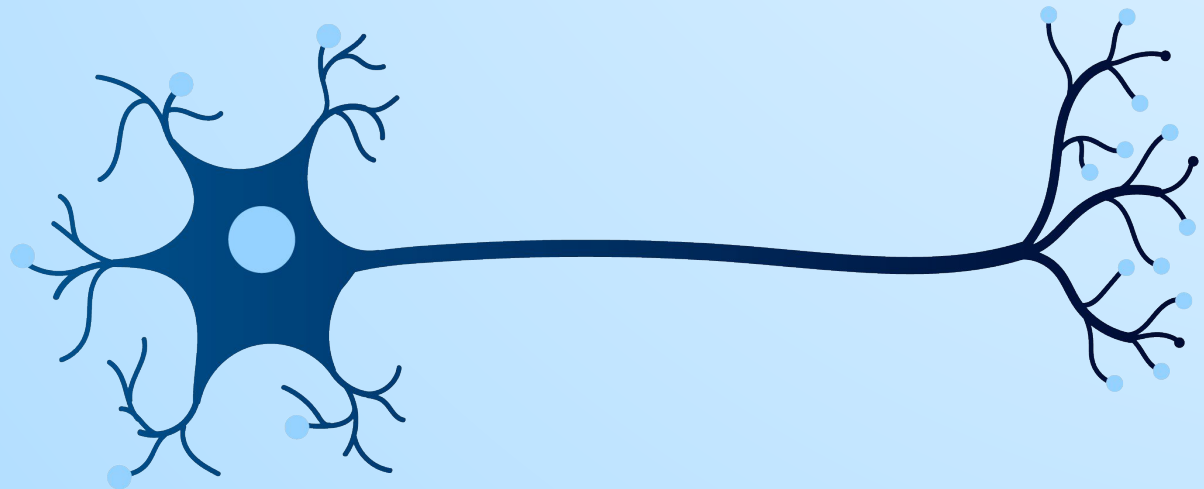
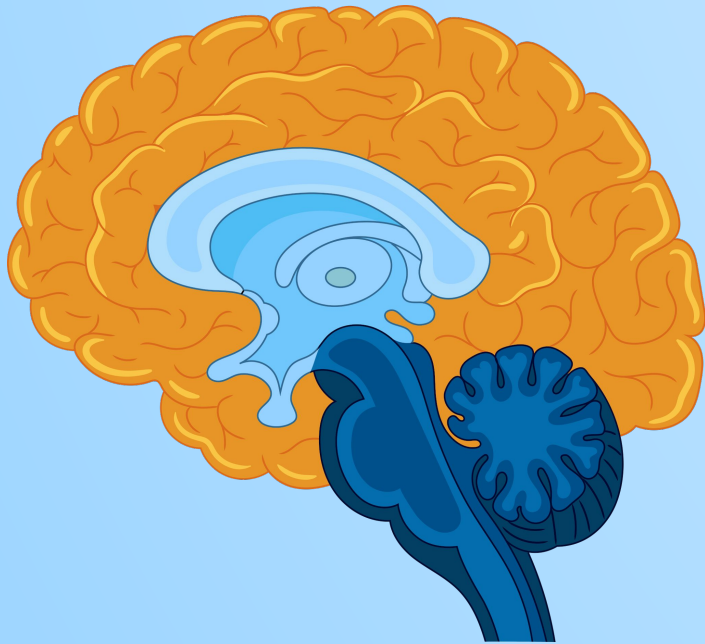
# The Human Brain



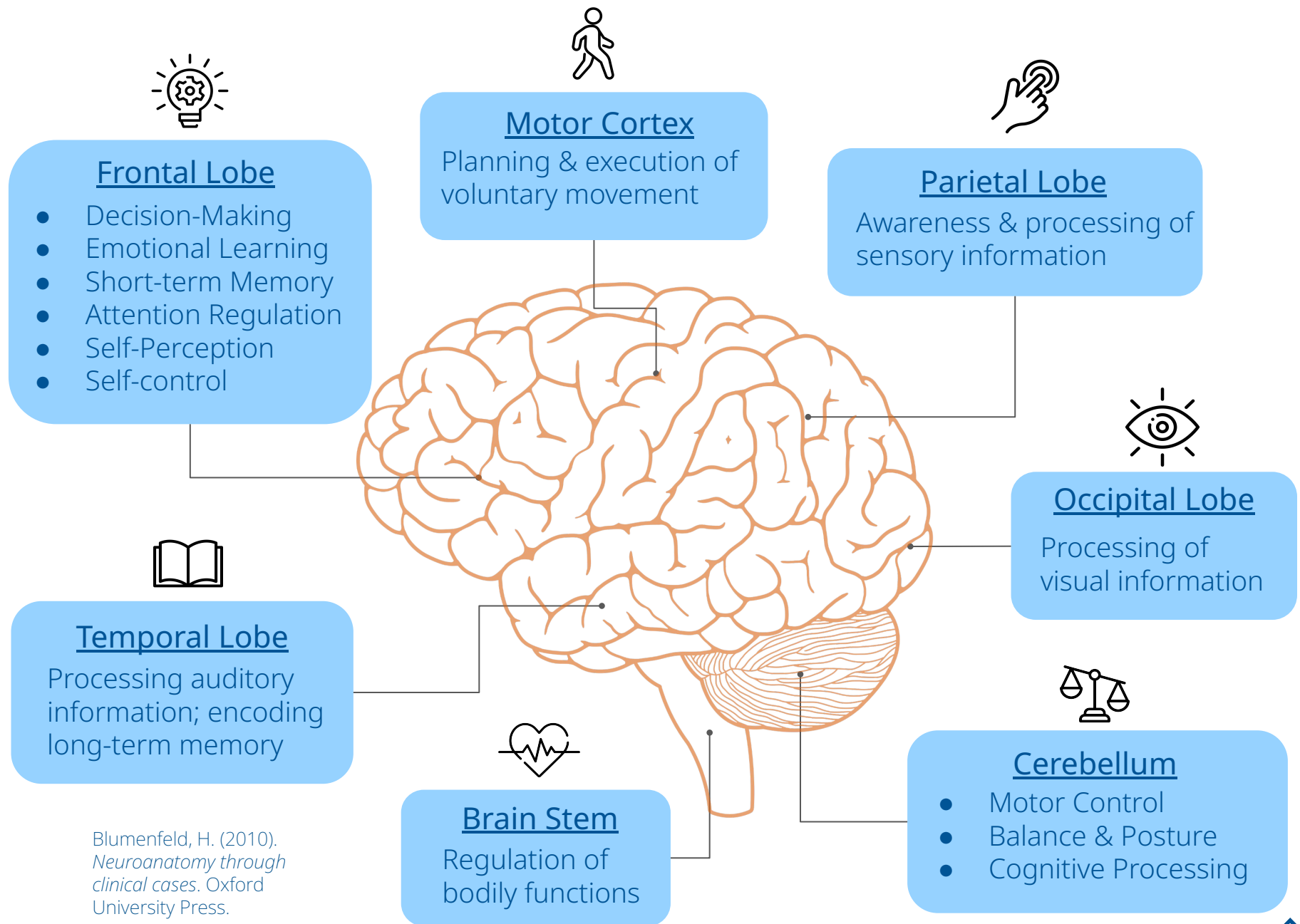
# Fire Together, Wire Together

The brain has approximately **100 billion neurons**, with **thousands of synapses** between each neuron.

Neurons all communicate via tiny **electrical signals** through these synapses.

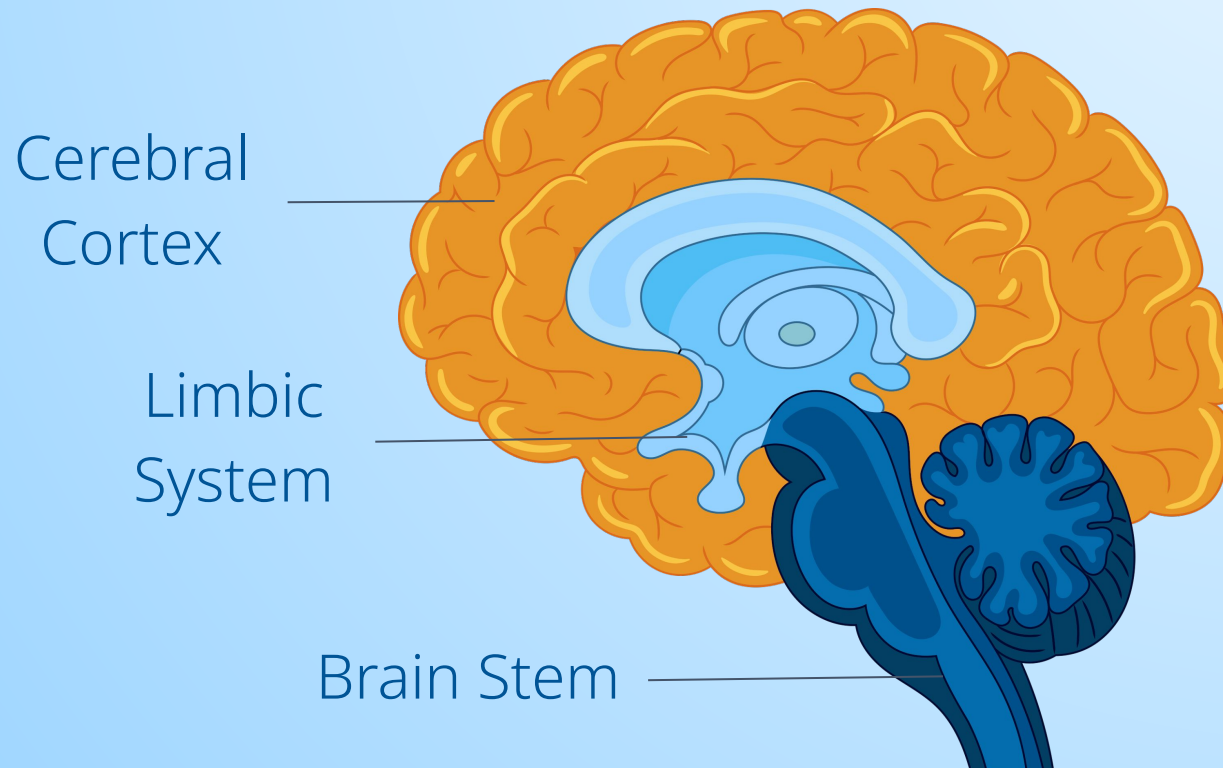


# Functions of the Brain



Blumenfeld, H. (2010).  
*Neuroanatomy through  
clinical cases*. Oxford  
University Press.

# Layers of the Brain



The human brain contains **16 billion** neurons in the cerebral cortex.

*By comparison:*

Gorillas	9 billion
Elephants	5.6 billion
Giraffes	1-2 billion
Parrots	1-2 billion

Kaas J. H. (2011). Neocortex in early mammals and its subsequent variations. *Annals of the New York Academy of Sciences*, 1225, 28–36.

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Herculano-Houzel, S. (2017) 'Numbers of neurons as biological correlates of cognitive capability', *Current Opinion in Behavioral Sciences*, 16, pp. 1–7.



# Directional Terminology

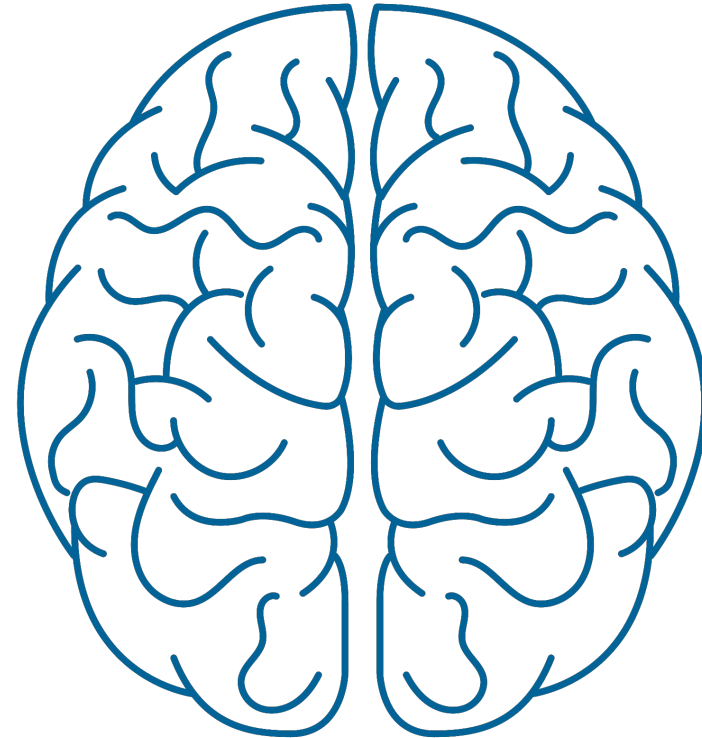
Dorsal



Ventral



Lateral ← Medial → Lateral



# DLPFC

## Left dorsolateral prefrontal cortex (DLPFC)

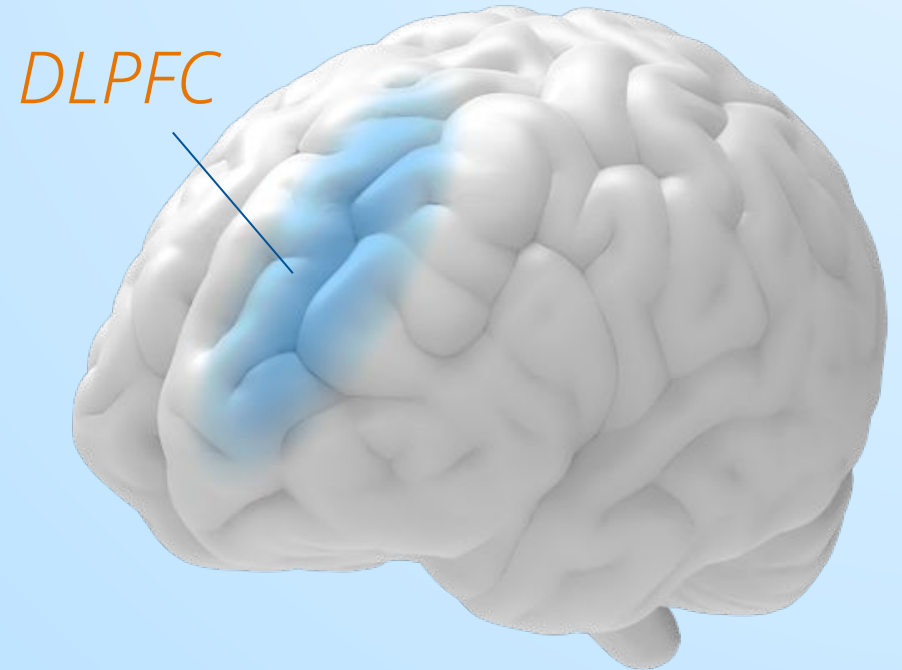
*The left frontal part of the brain*

Today's fast-paced world leads to **underactivity** of this center, resulting in its diminished functions – even in otherwise **healthy individuals**.

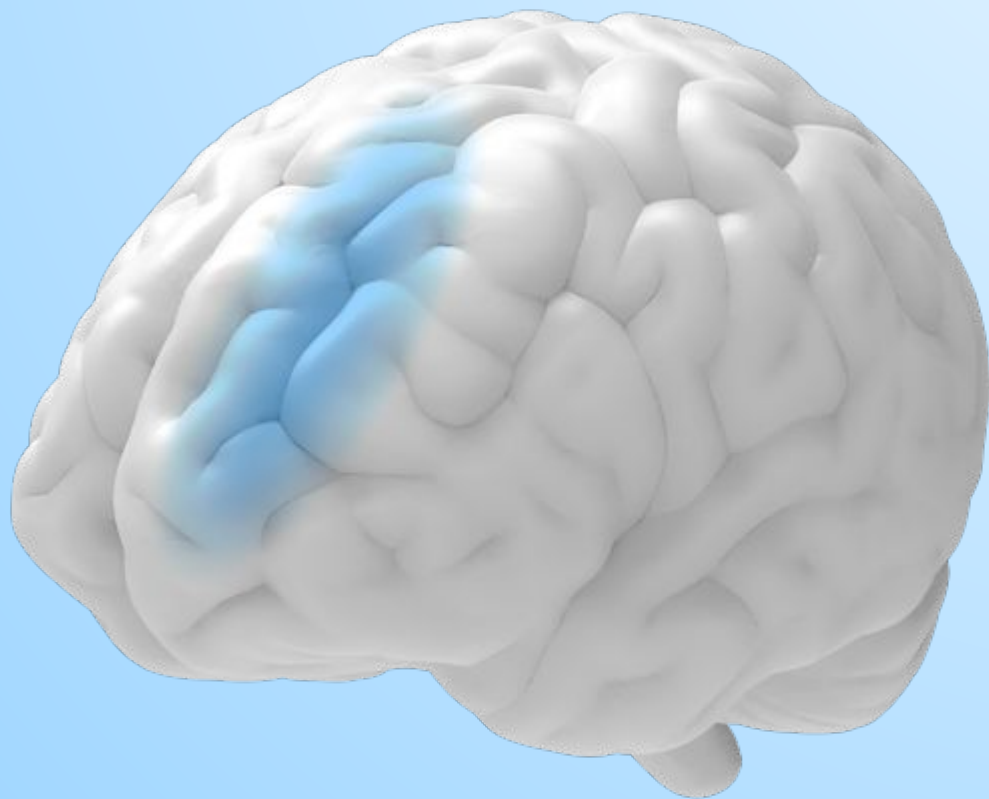
**EXOMIND** reactivates the left DLPFC restoring patients' emotional balance and cognitive function.

Arnsten A. F. (2015). Stress weakens prefrontal networks: molecular insults to higher cognition. *Nature neuroscience*, 18(10), 1376–1385. <https://doi.org/10.1038/nn.4087>

**EXOMIND**



# Why is the DLPFC so crucial?



The DLPFC acts as the brain's **executive control hub**. It receives inputs from inner brain structures to **process information**.

The DLPFC integrates these signals, **evaluates options**, and makes decisions to **guide actions and emotional responses**.

By managing this complex communication network, **the DLPFC ensures a balance** between logic, emotion, and action.



EXOMIND

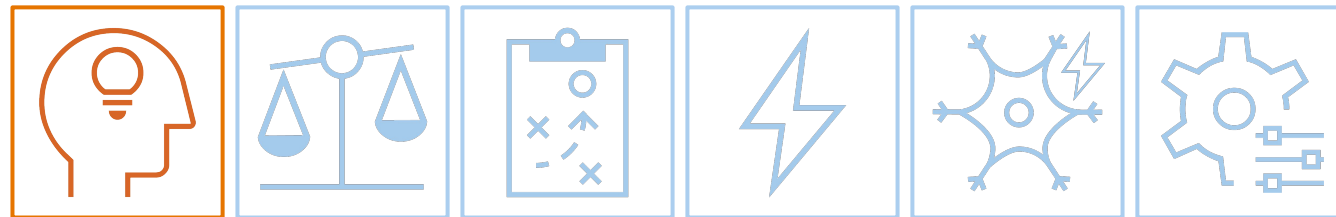
From  
Thoughts  
to  
Action



# Thought to Action

## 1. Idea Formation (Thought Initiation)

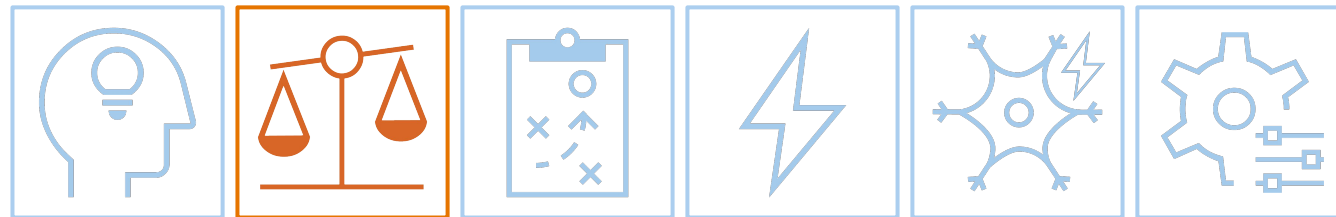
- Where it happens: **The prefrontal cortex of your brain**
- What happens:
  - **You generate a thought or intention.** For example, “I want to pick up a glass of water”
  - **This thought could arise from a need, desire, or external stimulus** (like feeling thirsty)



# Thought to Action

## 2. Decision-Making

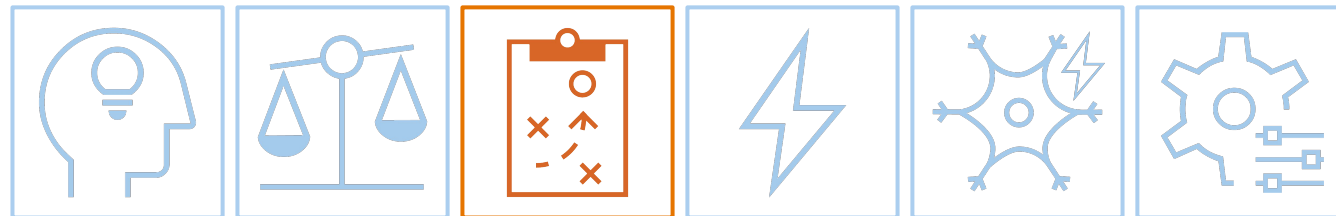
- Where it happens: **Still in the prefrontal cortex**
- What happens:
  - **Your brain evaluates the thought:** "Should I act on this? Is it the right time?"
  - **This involves logic, emotions, and past experiences**



# Thought to Action

## 3. Planning the Action

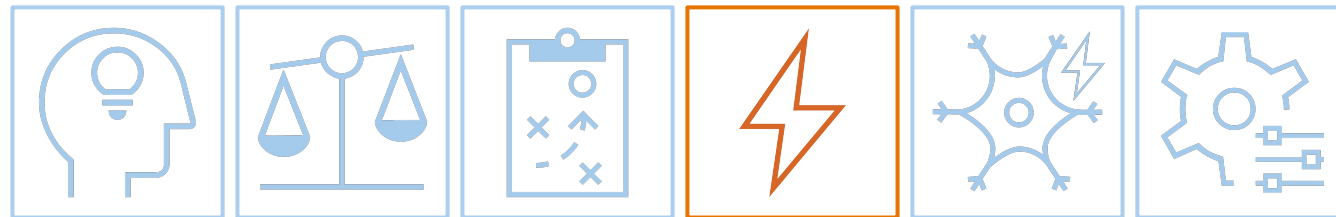
- Where it happens: **The motor cortex and surrounding areas**
- What happens:
  - **Once you decide to act, your brain plans the movements needed**
  - For example: **Your brain calculates how to move your arm, hand, and fingers** to grab the glass



# Thought to Action

## 4. Sending the Signal (Action Potential)

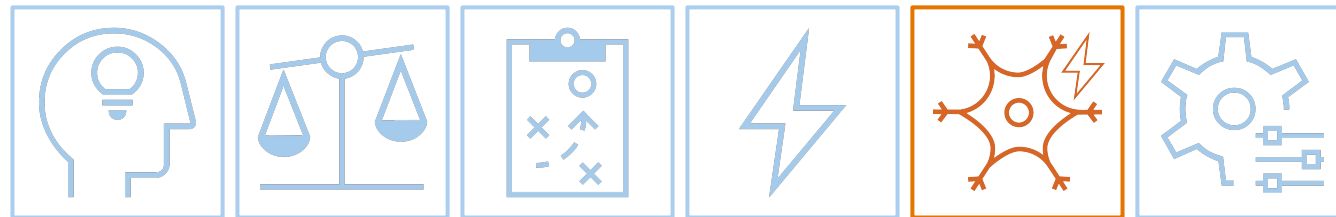
- Where it happens: **Neurons and the motor cortex**
- What happens:
  - The brain sends electrical signals (action potentials) down the spinal cord to motor neurons
  - These signals tell your muscles exactly how to contract and move



# Thought to Action

## 5. Executing the Action

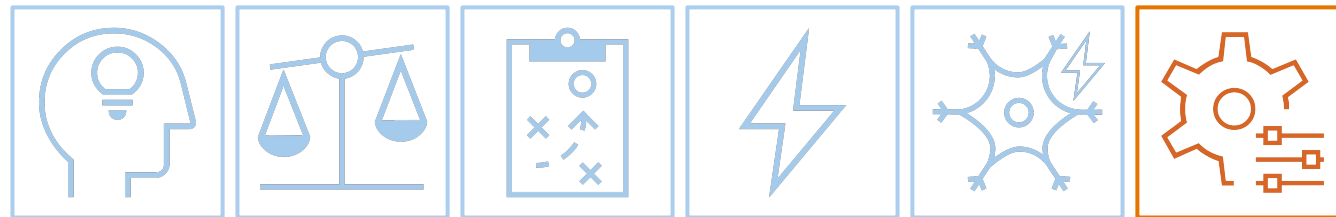
- Where it happens: **Your muscles**
- What happens:
  - The motor neurons release chemical messengers (neurotransmitters) at the neuromuscular junction
  - This triggers your muscles to contract and perform the action, such as reaching for the glass



# Thought to Action

## 6. Feedback and Adjustment

- Where it happens: **The sensory system and cerebellum**
- What happens:
  - **As you perform the action, your body sends feedback to your brain about how it's going**
  - For example, if the glass is heavier than expected, **your brain adjusts the muscle force to lift it**



# Summary of the Flow

1. **Thought:** “I want to drink water”
2. **Decision:** “Yes, I'll do it”
3. **Plan:** Brain organizes how to move
4. **Signal:** Electrical impulses travel to muscles
5. **Action:** You pick up the glass
6. **Adjustment:** Brain fine-tunes the action as it happens

