

Chapter 18 : Neural Control and Coordination

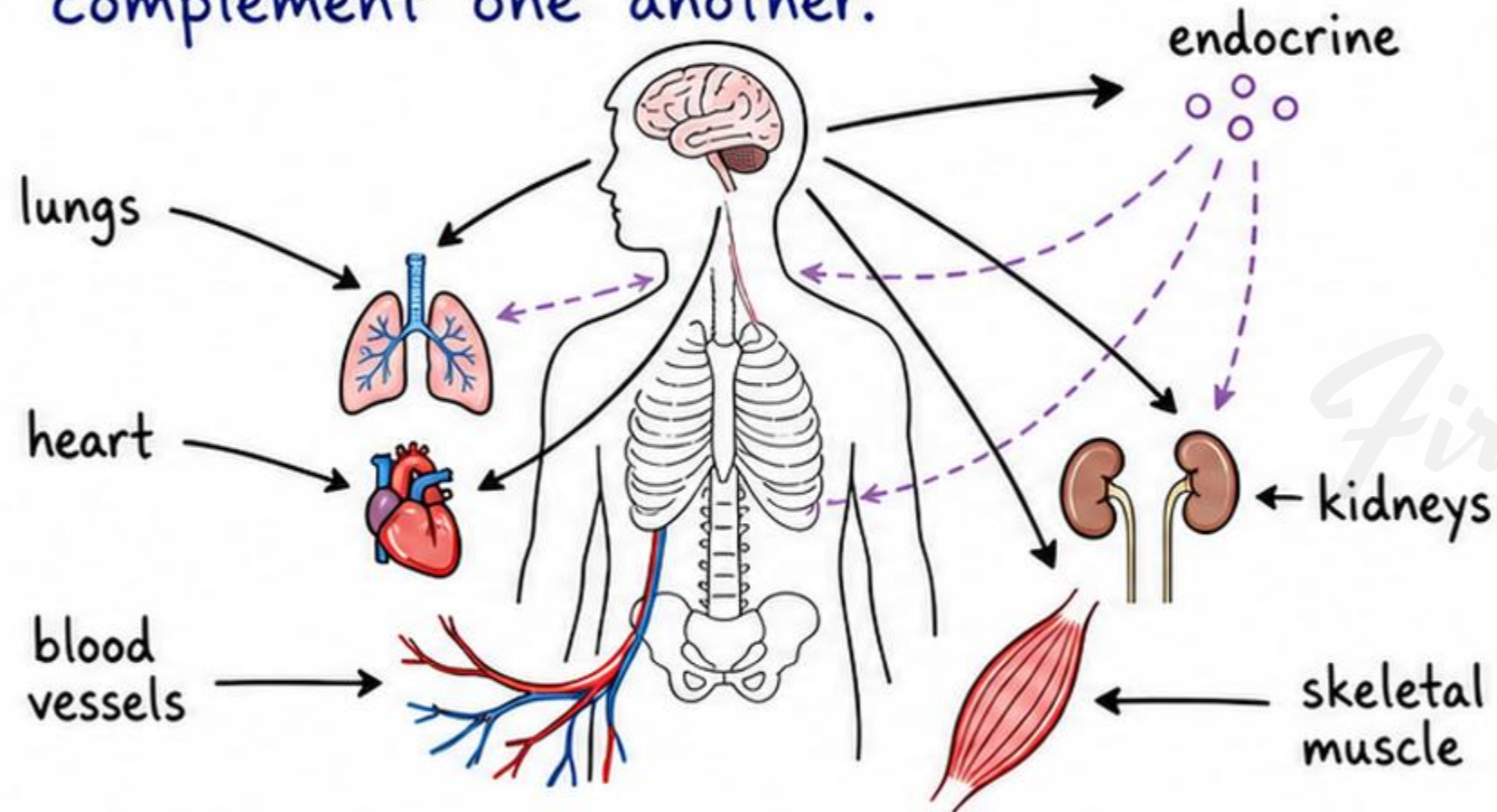
Biology Notes | Class 11



COORDINATION & HOMEOSTASIS

COORDINATION

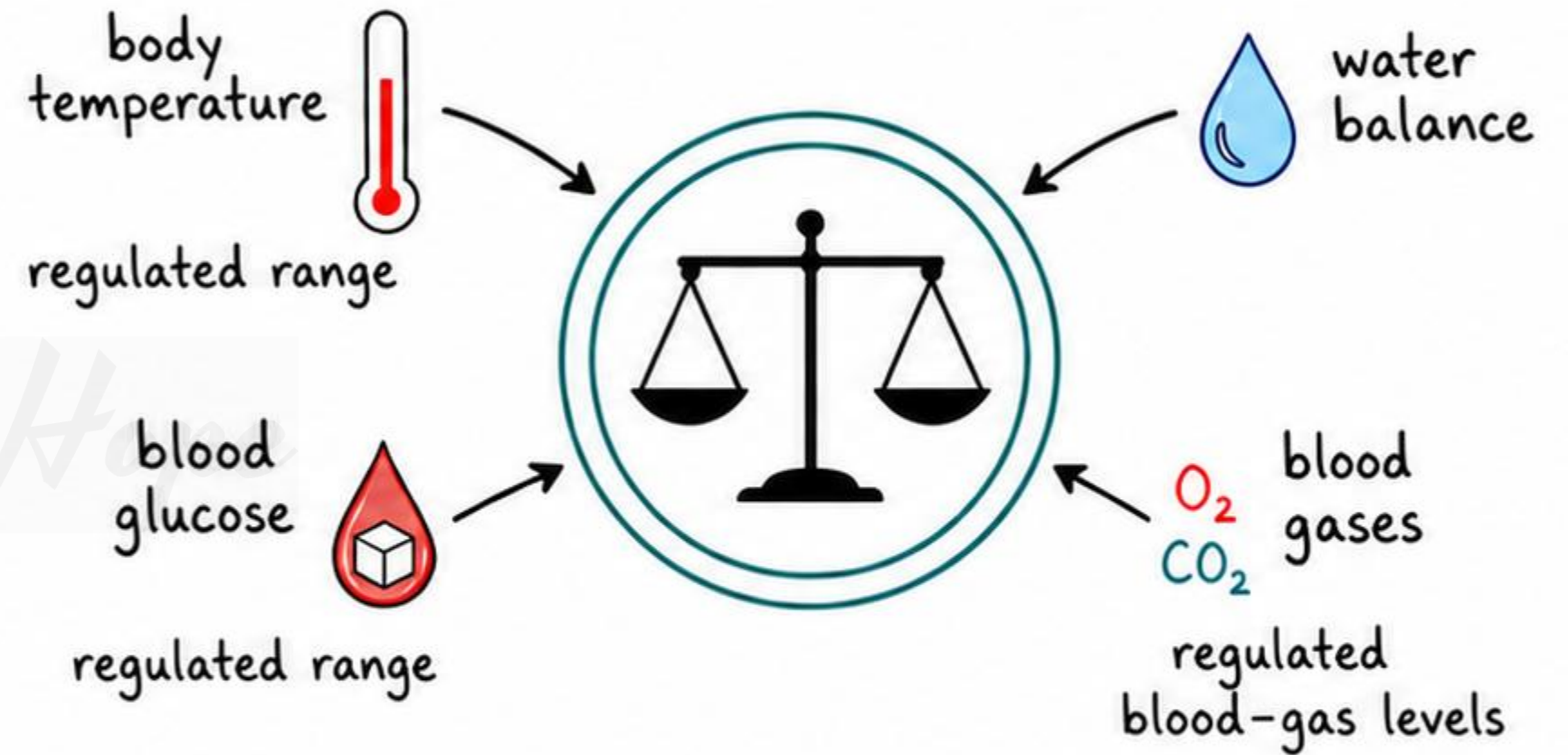
Coordination is the organised interaction of body parts so they work together and complement one another.



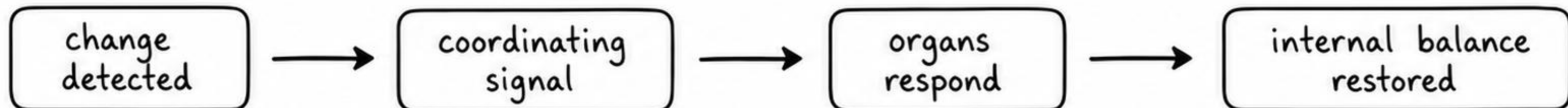
- Different organs change their activity in a linked way.
- This produces an appropriate response to internal or external change.

HOMEOSTASIS

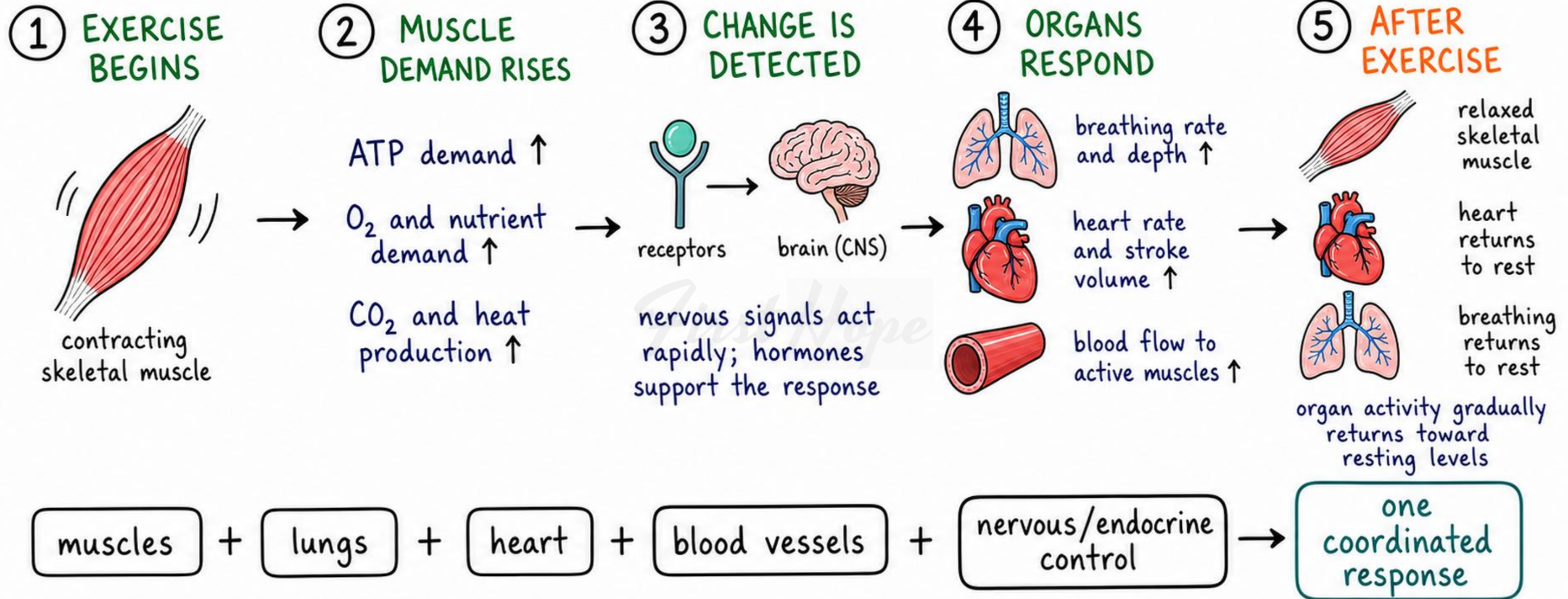
Homeostasis is the maintenance of a relatively stable internal environment.



- Values are regulated within suitable ranges—not kept perfectly fixed.
- Nervous and endocrine systems are the two main coordinating systems.



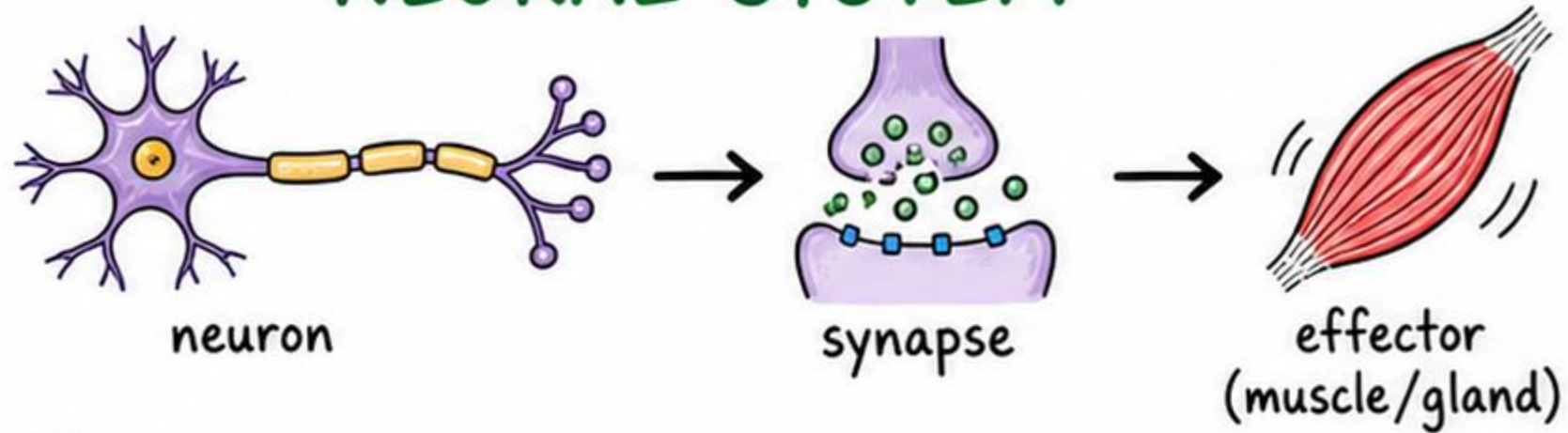
COORDINATED RESPONSE TO EXERCISE



- The response matches oxygen delivery and waste removal to the muscles' changing needs.
- Homeostasis is maintained by coordinated adjustments, not by one organ acting alone.

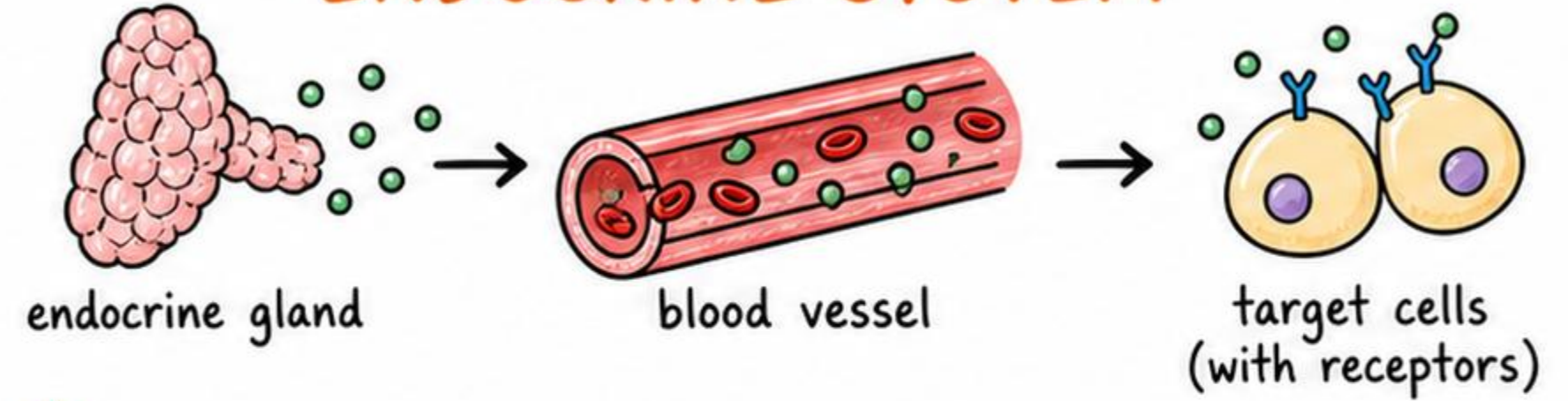
NEURAL vs ENDOCRINE CONTROL

NEURAL SYSTEM



-  **Signal:** → electrical impulses along neurons; chemical neurotransmitter at synapses.
-  **Route:** → point-to-point through nerve pathways.
-  **Onset:** → usually very rapid — milliseconds to seconds.
-  **Duration:** → usually brief.
-  **Action:** → often specific and precisely targeted.
-  **Examples:** → withdrawal reflex, pupil constriction, rapid change in heart rate.

ENDOCRINE SYSTEM



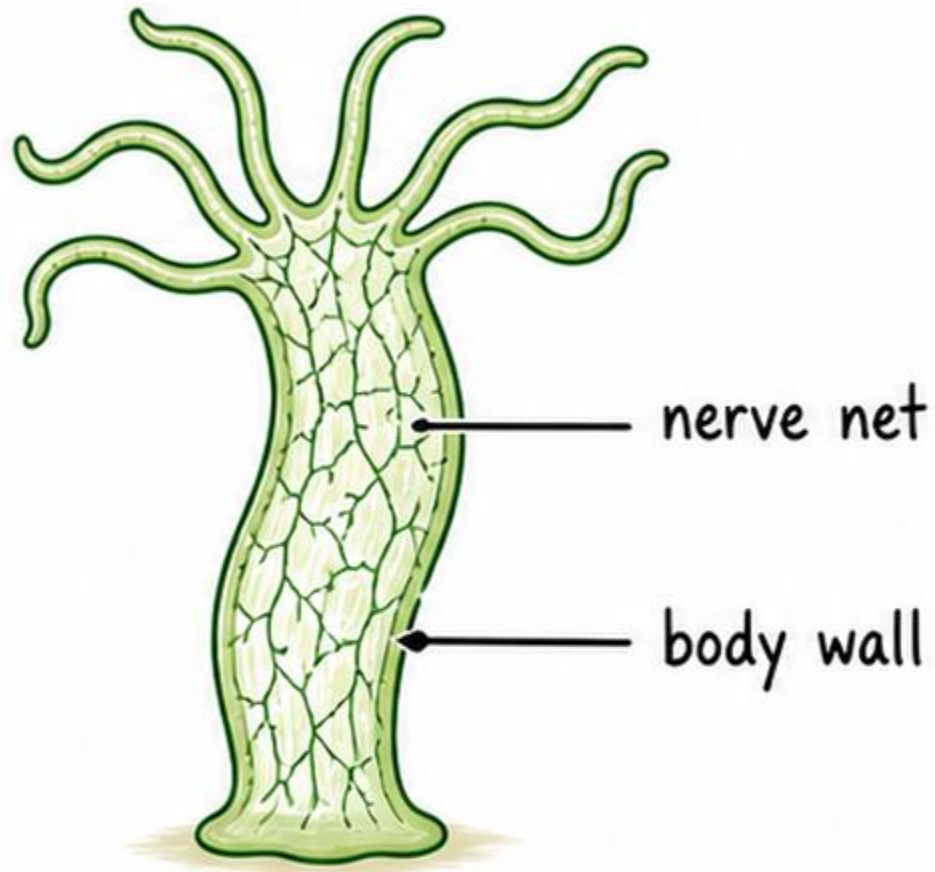
-  **Signal:** → hormones carried in blood.
-  **Route:** → blood transports hormones to cells with suitable receptors.
-  **Onset:** → usually slower — seconds to hours or longer.
-  **Duration:** → often longer-lasting.
-  **Action:** → may affect many tissues and organs.
-  **Examples:** → blood-glucose regulation, growth, reproduction.



TOGETHER: nervous and endocrine systems provide coordinated, integrated control of body functions. The exact speed and duration depend on the signal and target.

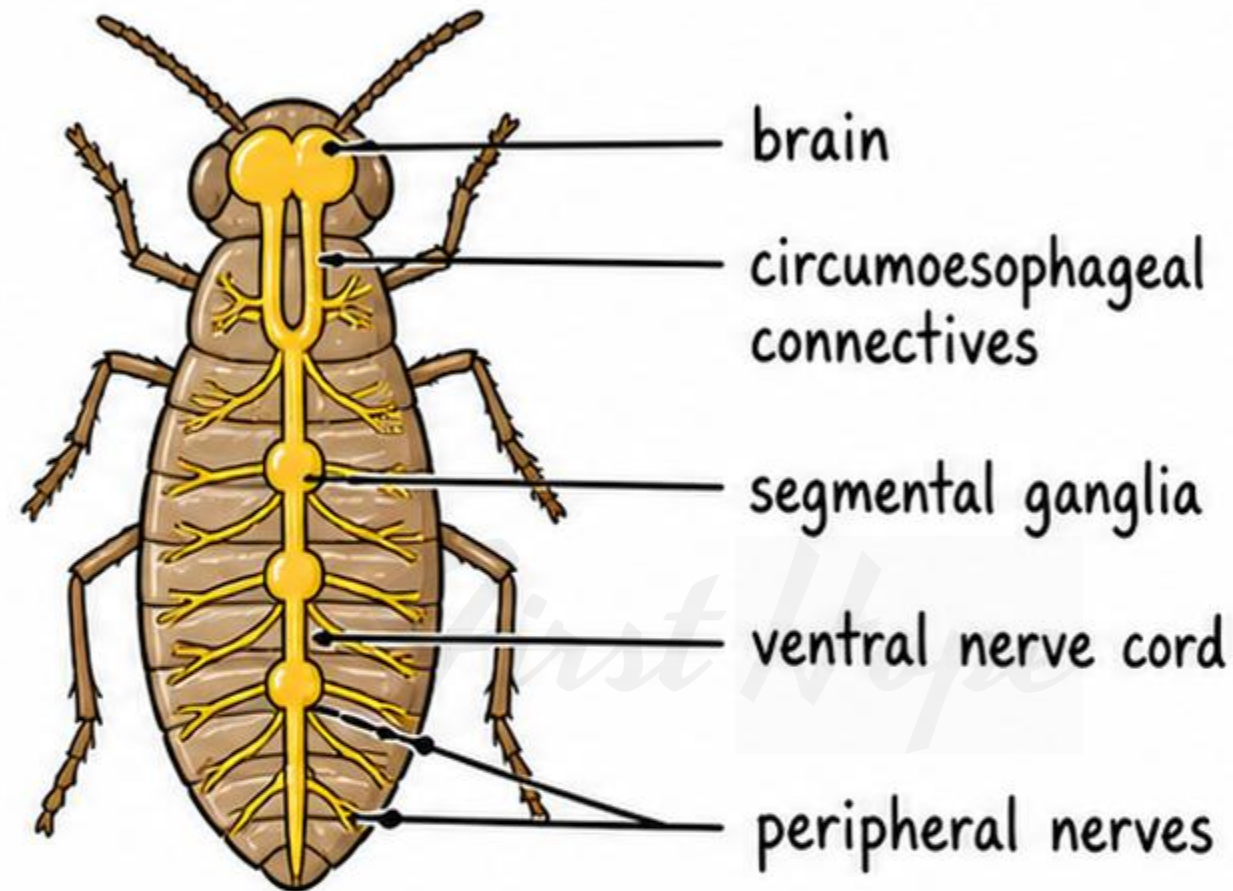
NEURAL ORGANISATION & CENTRALISATION

HYDRA — NERVE NET



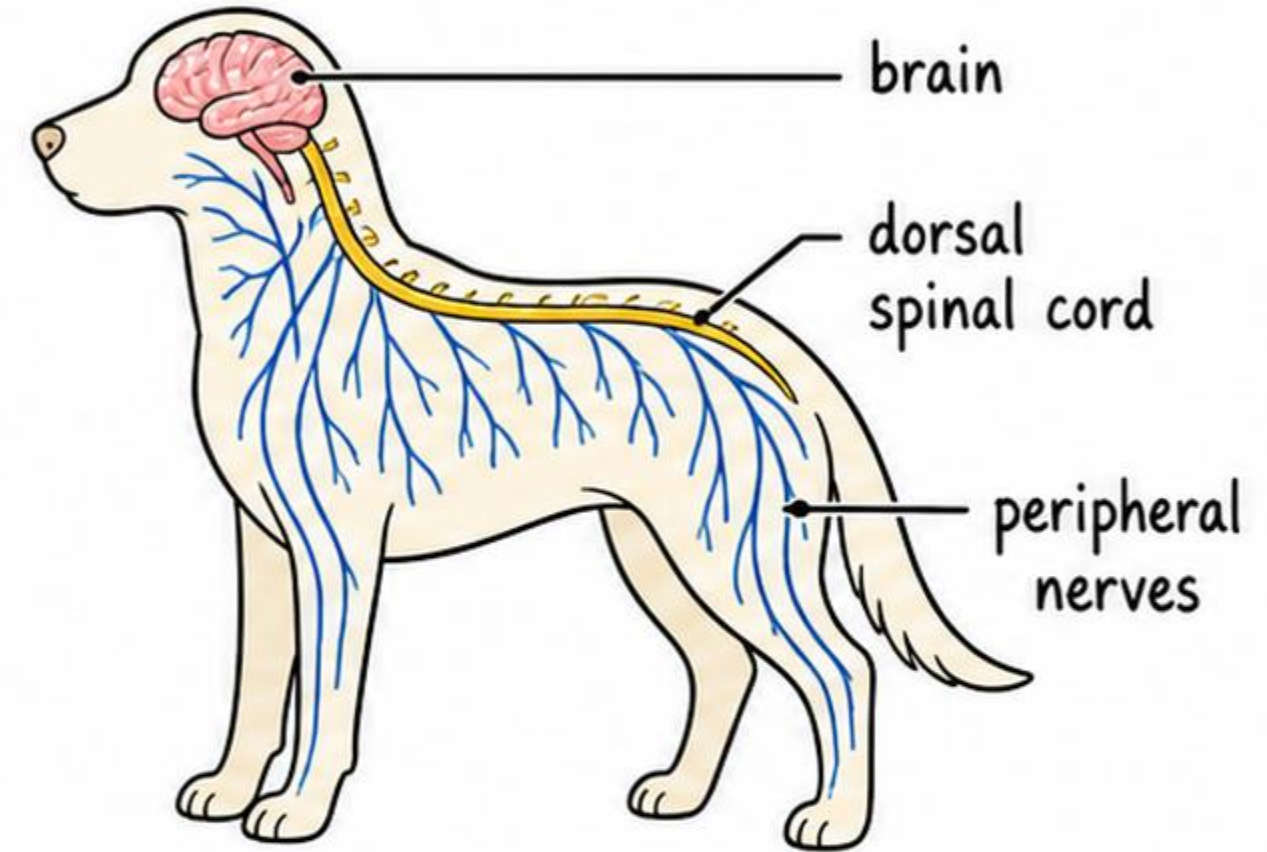
- simple, diffuse network
- impulses can spread in several directions
- no central brain

INSECT — GANGLIA + NERVE CORD



- ganglia are arranged segmentally
- a ventral nerve cord links them

VERTEBRATE — CNS + PNS



- brain and spinal cord form a centralised CNS
- peripheral nerves connect the CNS to the body

increasing centralisation and concentration of nervous tissue

Centralisation allows more integrated processing and control.



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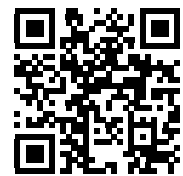


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