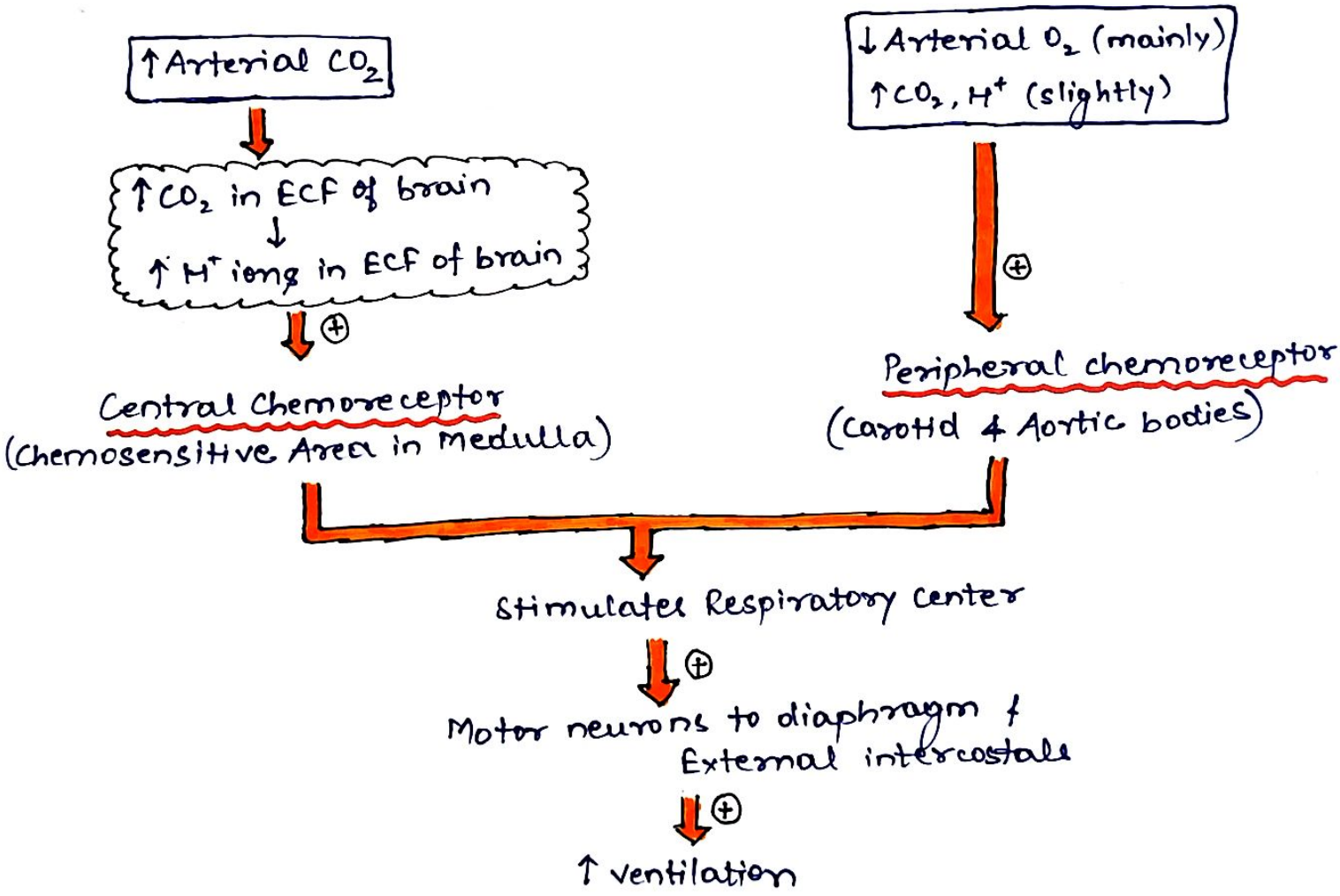
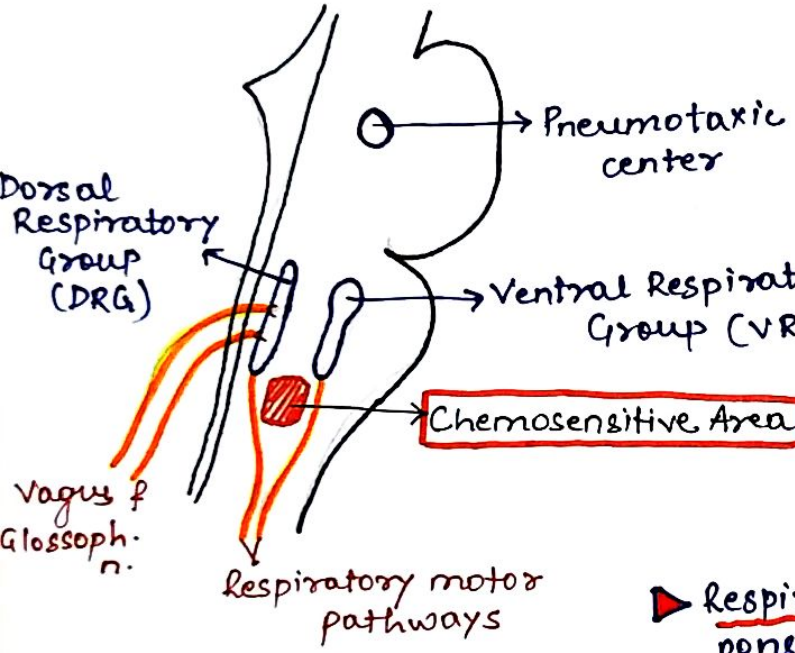
CHEMICAL REGULATION OF RESPIRATION



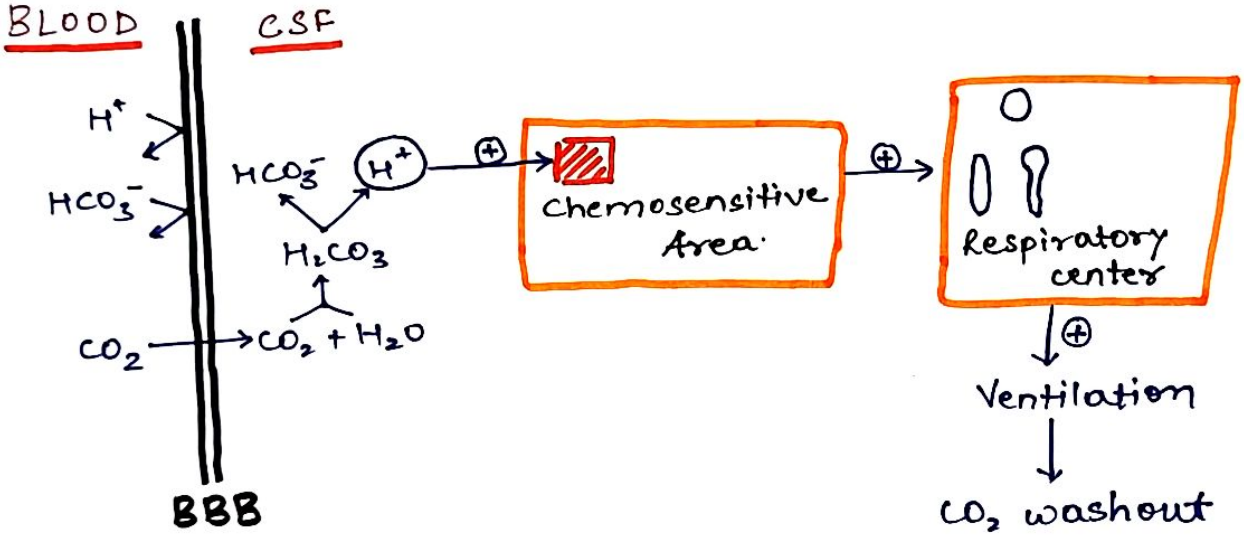


- is a central chemoreceptor
- located bilaterally beneath ventral surface of medulla.

▶ Respiratory center located in medulla & pons include

- Pneumotaxic center
- DRG
- VRG

Mechanism of Action of Central Chemoreceptor



Peripheral Chemoreceptor System

➡ **Detects**

Mainly :- O_2 in blood

Less extent :- CO_2 , H^+

➡ **Peripheral chemoreeeptors**

- **Carotid bodies** (mostly)
  ↳ Located bilaterally in bifurcation of common carotid artery

- **Aortic bodies** (few)
  ↳ Located along Arch of Aorta.

➡ pO_2 below normal in blood
↓
powerfull stimulation of chemoreceptor
↓
Nerve signals through vagus & glossopharyngeal n.
↓
DRG of medulla

pCO_2 & p^H
↓
Slight stimulation of p. chemoreceptor

Peripheral chemoreceptors (Carotid & Aortic bodies) → Glomus cells → synapse with n. endings

↓ have

O_2 sensitive K^+ channels

↓

Inhibited by ↓ pO_2

↓

cells depolarise

↓

Ca^{++} VGC open → Intracellular $[Ca^{++}]$ ↑↑

↓

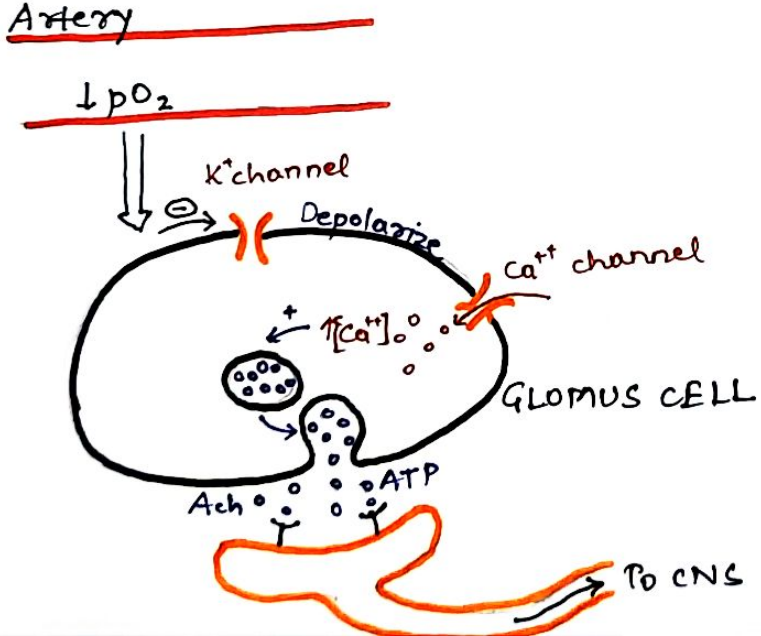
NT Release

↓

Nerve signals sent to CNS (DRG)

↓

Stimulate ventilation



	Central chemoreceptor	Peripheral chemoreceptor
Location	Chemosensitive Area in Medulla	Carotid & Aortic Bodies.
Stimuli	↑ Arterial CO_2	↓ Arterial O_2 (mainly) ↑ CO_2 & H^+ (slightly)
Innervation	N. fibre directly project to Respiratory center	Aortic bodies by vagus n. Carotid bodies by glossoph. n.
Rapidity in Response	Slower response as compared to peripheral receptors	Five times as rapid as central stimulation.