HEART RATE

Dr.Komal chavda

Dept. of physiology

HEART RATE

❑NORMAL HEART RATE

- Normal heart rate is **72/minute.**
- It ranges between 60 and 80 per minute.

TACHYCARDIA

Tachycardia is the increase in heart rate above **100/ minute.**

Physiological

1. Childhood
2. Exercise
3. Pregnancy
4. Emotional conditions such as anxiety.

Pathological

1. Fever
2. Anemia
3. Hypoxia
4. Hyperthyroidism
5. Hypersecretion of catecholamines
7. Diseases of heart valves.

BRADYCARDIA

Bradycardia is the decrease in heart rate below **60/ minute.**

Physiological

1. Sleep
2. Athletes.

- ***Pathological***
- 1. Hypothermia
- 2. Hypothyroidism
- 3. Heart Attack
- 4. Congenital Heart Disease
- 5. Degenerative Process Of Aging
- 6. Obstructive Jaundice
- 7. Increased Intracranial Pressure.

REGULATION OF HEART RATE

- Heart Rate is Regulated by the **Nervous Mechanism**, Which Consists Of Three Components:

A. Vasomotor Centre

B. Motor (Efferent) Nerve Fibers to the Heart

C. Sensory (Afferent) Nerve Fibers From the Heart.

VASOMOTOR CENTER – CARDIAC CENTER

- Vasomotor center is the **nervous center that regulates the Heart rate**.
- It is the same center in brain, which regulates the blood pressure.
- Vasomotor center is bilaterally situated in the **Reticular formation** of medulla oblongata and lower part of pons**.**
- ***Areas of vasomotor center :***

Vasomotor center is formed by three areas:

- 1. Vasoconstrictor area
- 2. Vasodilator area
- 3. Sensory area.

VASOCONSTRICTOR AREA – CARDIOACCELERATOR CENTER

❑ ***Situation***

- Vasoconstrictor area is situated in the reticular formation Of medulla in floor of IV ventricle and it forms the lateral Portion of vasomotor center.
- It is otherwise known as **Pressor area** or cardioaccelerator center.

❑ ***Function***

- Vasoconstrictor area increases the heart rate by sending Accelerator impulses to heart, through **sympathetic Nerves.**
- It also causes constriction of blood vessels.
- Stimulation Of this center in animals increases the heart rate and Its removal or destruction decreases the heart rate.

❑ ***Control***

- Vasoconstrictor area is under the control of **hypothalamus** And **cerebral cortex.**

VASODILATOR AREA – CARDIOINHIBITORY CENTER

❑ ***Situation***

- Vasodilator area is also situated in the reticular formation of medulla oblongata in the floor of IV ventricle.
- It forms the medial portion of vasomotor center. It is also called **depressor area** or cardioinhibitory center.

❑ ***Function***

- Vasodilator area decreases the heart rate by sending inhibitory impulses to heart through vagus nerve.
- It also causes dilatation of blood vessels.

❑ ***Control***

- Vasodilator area is under the control of **cerebral cortex** and **hypothalamus.**
- It is also controlled by the impulses from baroreceptors, chemoreceptors and other sensory impulses via afferent nerves.

SENSORY AREA

❑ *Situation*

- Sensory area is in the posterior part of vasomotor center, which lies in **nucleus of tractus solitarius** in medulla and pons.

❑ *Function*

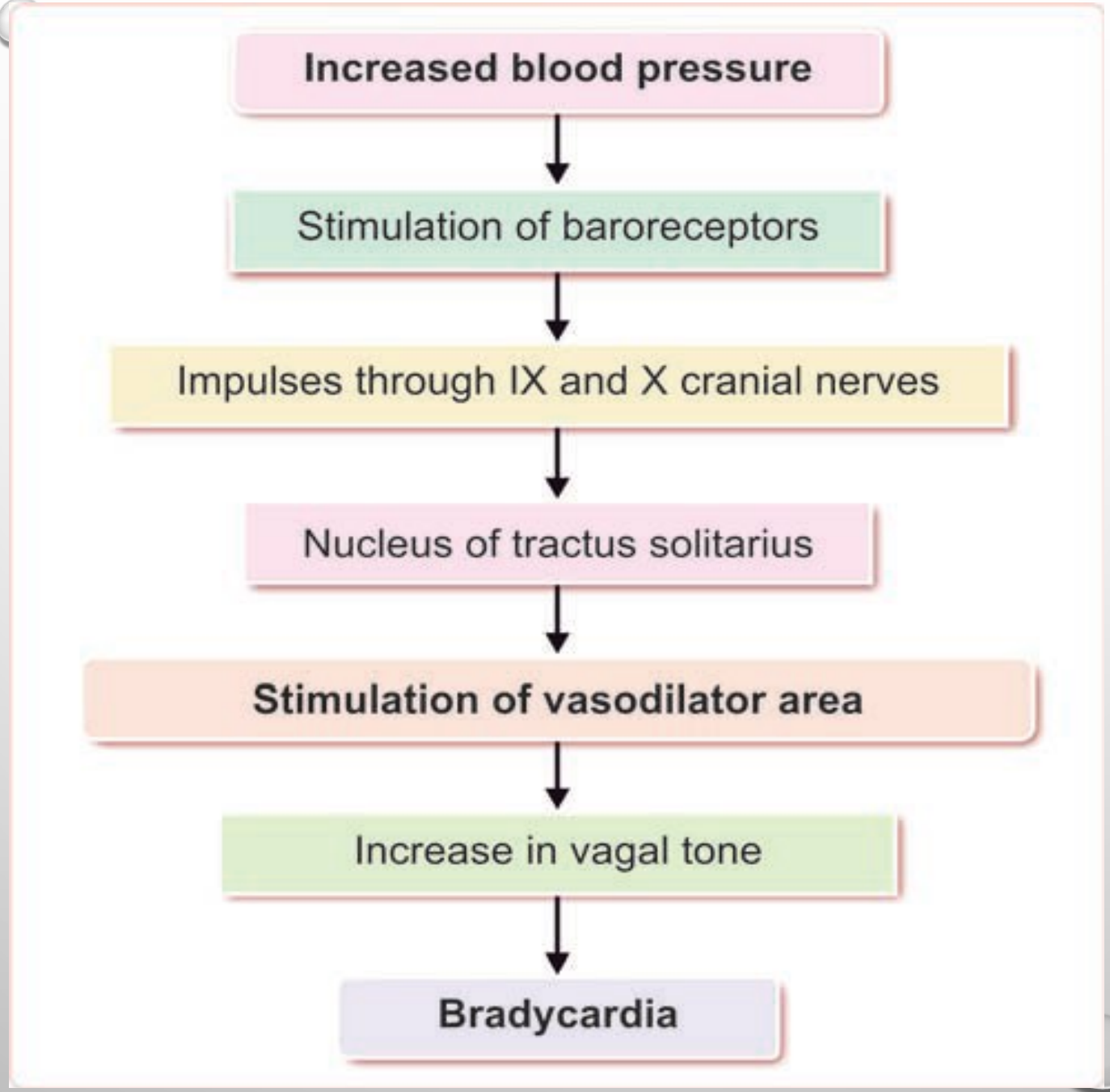
- Sensory area receives sensory impulse via glossopharyngeal nerve and vagus nerve from periphery, particularly from the baroreceptors.
- In turn, this area **controls** the vasoconstrictor and vasodilator areas.

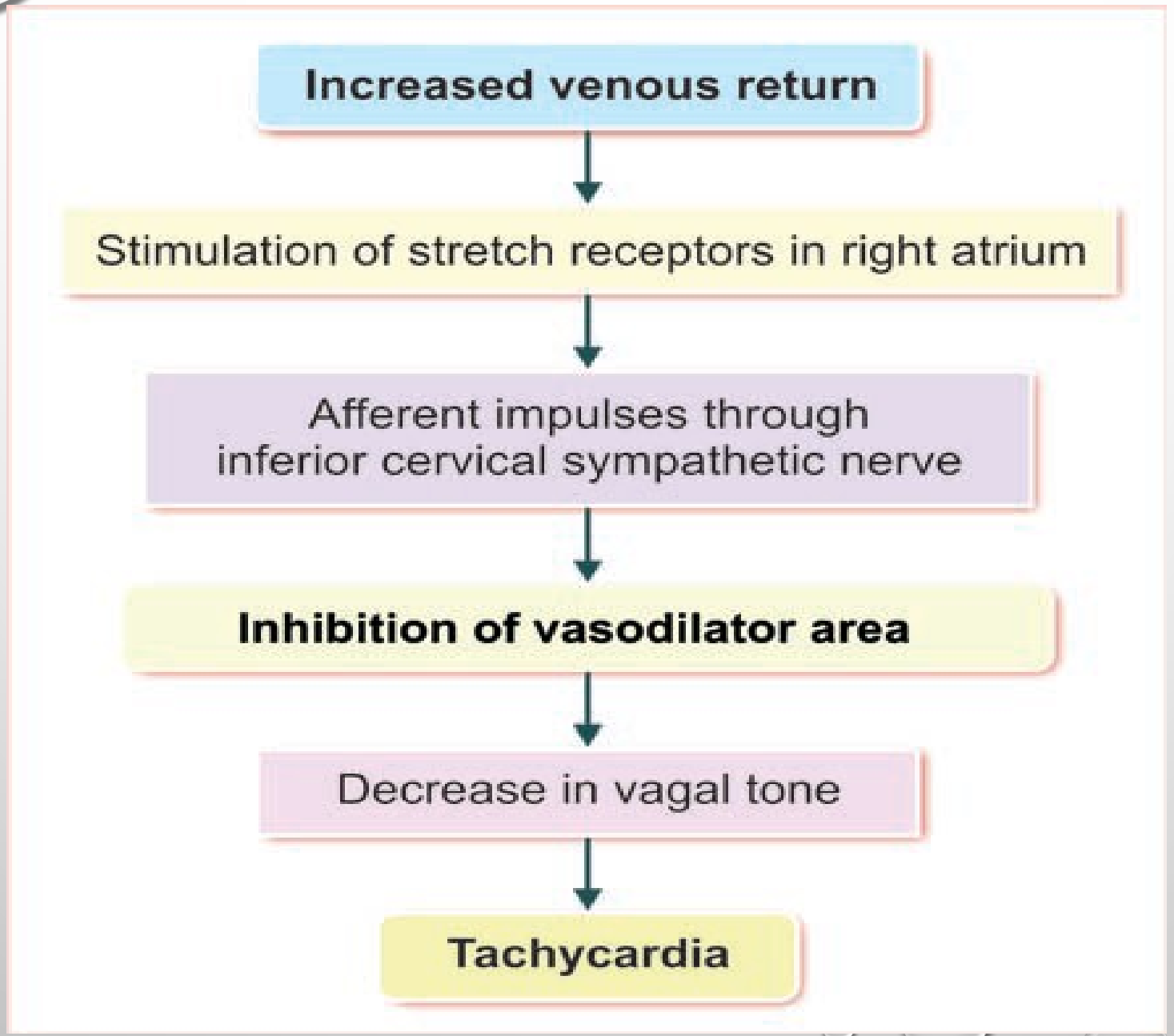
MOTOR (EFFERENT) NERVE FIBERS TO HEART

- Heart receives efferent nerves from both the divisions of autonomic nervous system.
- Parasympathetic fibers arise from the medulla oblongata and pass through vagus nerve.
- Sympathetic fibers arise from upper thoracic (T1 to T4) segments of spinal cord.

SENSORY (AFFERENT) NERVE FIBERS FROM HEART

- Afferent (sensory) nerve fibers from the heart pass through **inferior cervical sympathetic nerve.**
- These nerve fibers carry sensations of stretch and pain from the heart to brain via spinal cord.


Increased blood pressure
Stimulation of baroreceptors
Impulses through IX and X cranial nerves
Nucleus of tractus solitarius
Stimulation of vasodilator area
Increase in vagal tone
Bradycardia


Increased venous return
Stimulation of stretch receptors in right atrium
Afferent impulses through inferior cervical sympathetic nerve
Inhibition of vasodilator area
Decrease in vagal tone
Tachycardia

THANK YOU