

Blood Pressure Regulation

By Josefine Holum

- What is blood pressure?
- What happens when we have low blood pressure?
- What happens when we have high blood pressure?

What is blood pressure?

“The force exhibited on the walls of the arteries by circulating blood”

Systolic pressure: pressure on the arteries when your heart is pumping

Diastolic pressure: pressure on the arteries when your heart is resting

High blood pressure Hypertension: Systolic BP > 140mmHg Diastolic BP > 90mmHg	Low Blood pressure Hypotension. Systolic BP < 90mmHg Diastolic BP < 60
Causes stress and damage on the arterial walls.	Lack of blood flow: Insufficient delivery of oxygen and nutrients to the cells/organs.
Symptoms <ul style="list-style-type: none"> • Usually asymptomatic. • May cause headaches, shortness of breath and nosebleed if the pressure became very high. 	Symptoms: <ul style="list-style-type: none"> • Dizziness, Fainting, Blurred vision, Nausea and many more.
Diseases/conditions which may be caused by hypertension: <ul style="list-style-type: none"> • Myocardial infarction, Stroke, Aneurysm, Heart failure and many more 	Diseases/conditions caused by hypotension: <ul style="list-style-type: none"> • Shock



What is blood pressure?



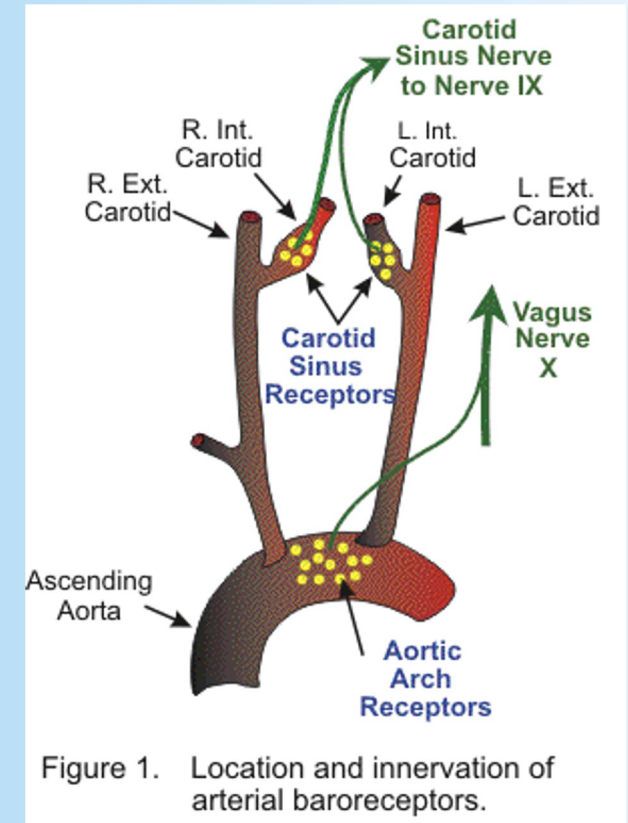
What happens when we have low blood pressure?



What happens when we have high blood pressure?

How does the body detect low blood pressure?

- Baroreceptors
- Aortic arch receptors
 - CN X: Vagus nerve
- Carotid sinus
 - CN IX: Glossopharyngeal nerve

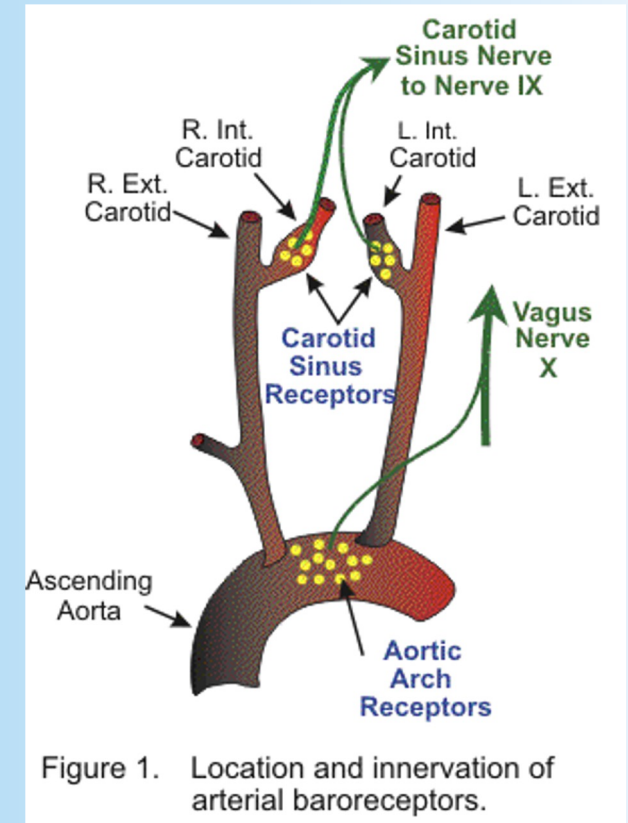


How does the body detect low blood pressure?

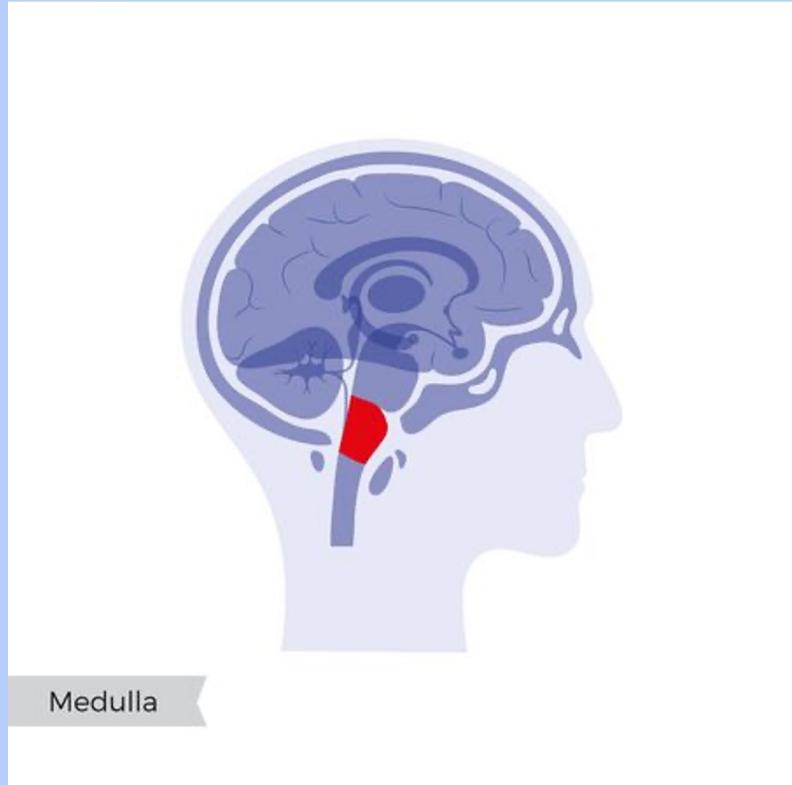
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- Nucleus Tractus Solitarius

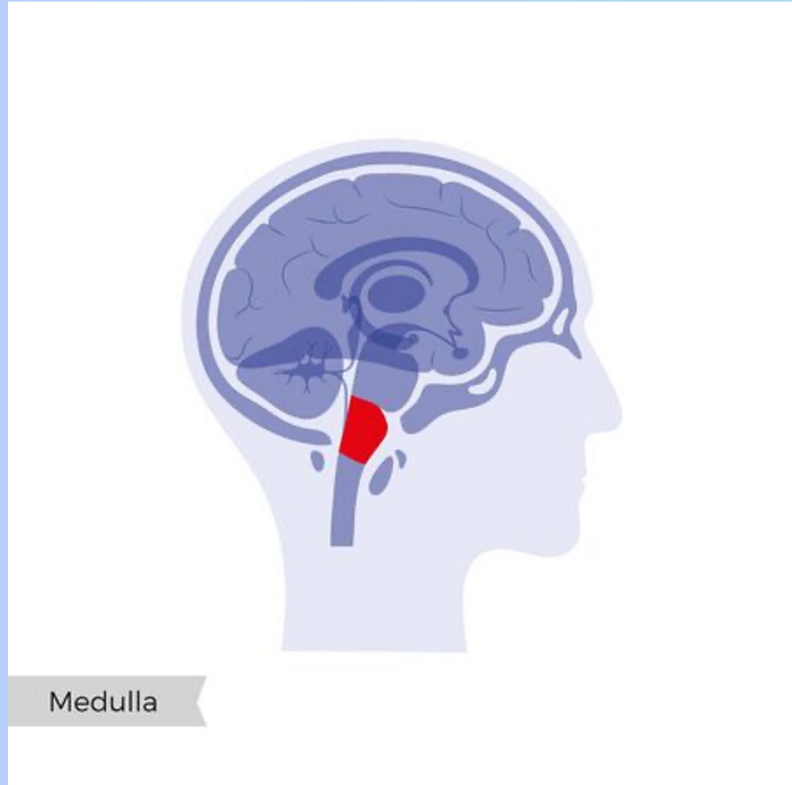


Nucleus Tractus Solitarius



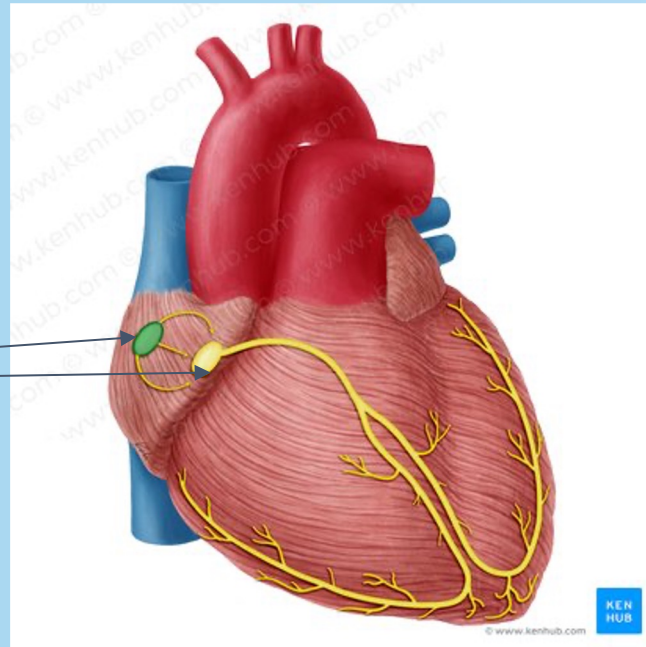
- Cardioaccelerator center
- Cardioinhibitory center
- Vasomotor center

Nucleus Tractus Solitarius



- Cardioaccelerator center +
- Cardioinhibitory center -
- Vasomotor center +

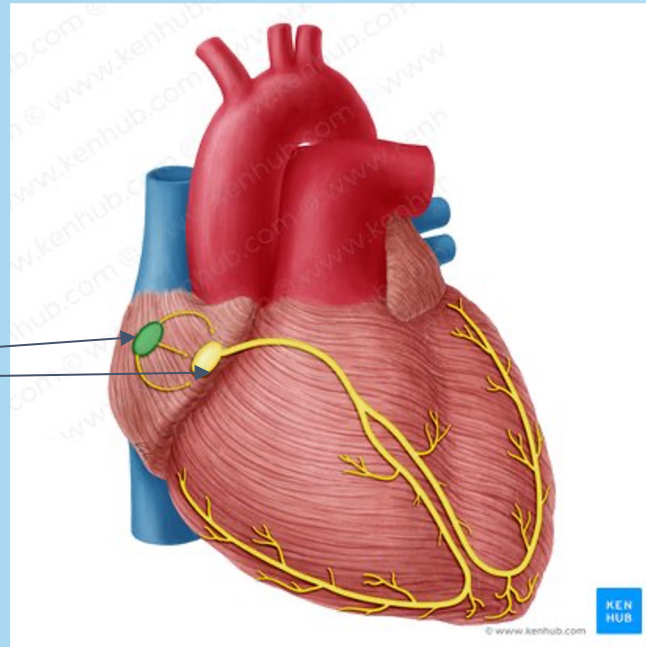
Cardioacceleratory center



- Sinoatrial node
- Atrioventricular node

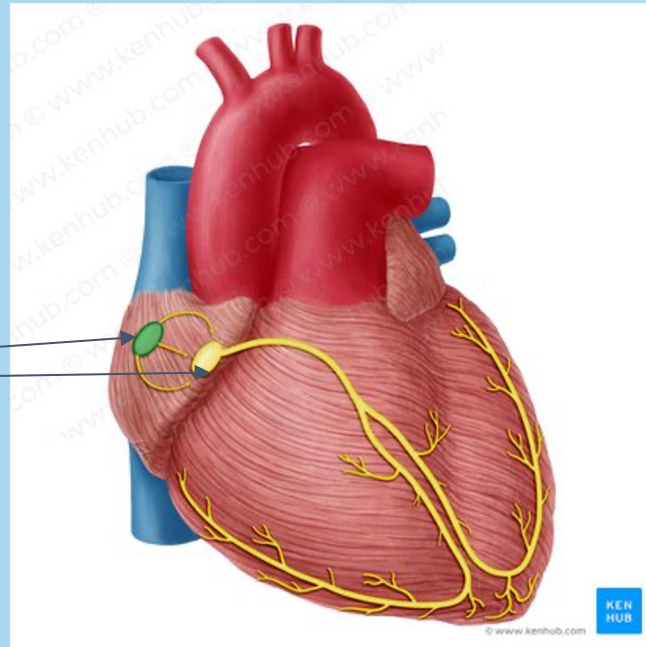
Cardioacceleratory center

- Sinoatrial node
- Atrioventricular node



B1 ADRENERGIC RECEPTORS

Cardioacceleratory center



- Sinoatrial node
- Atrioventricular node

Increased heart rate

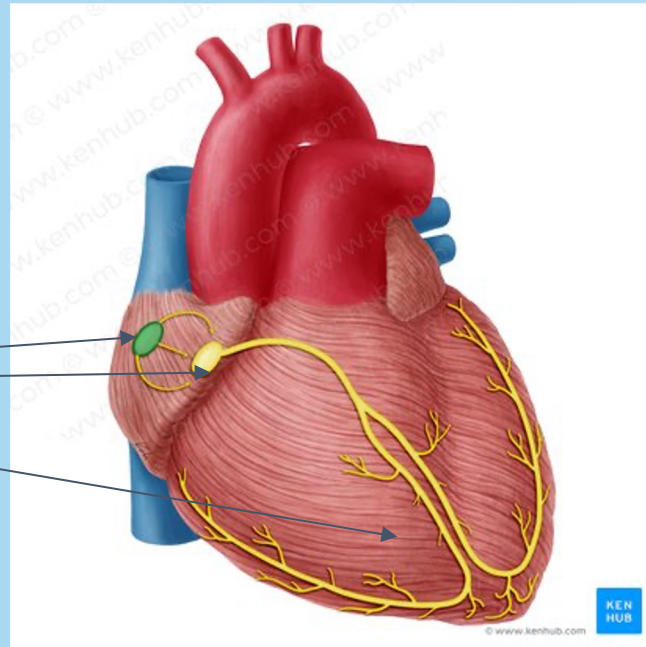


Increased cardiac output



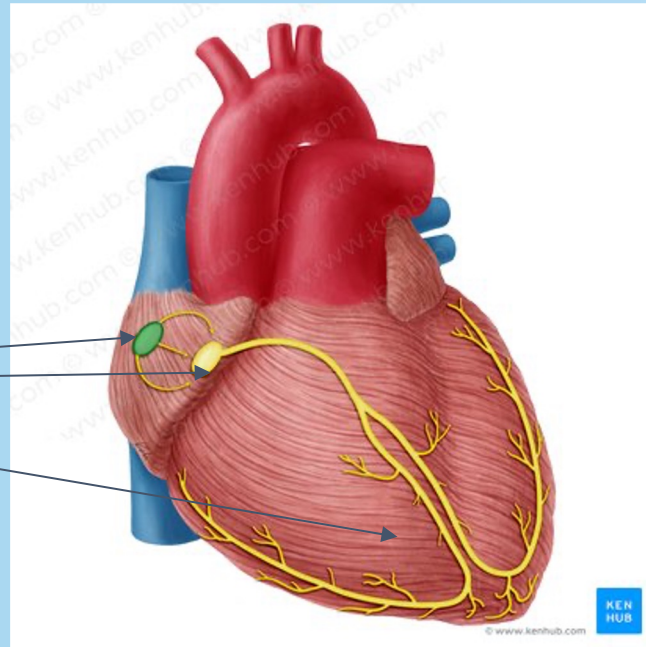
Increased blood pressure

Cardioacceleratory center



- Sinoatrial node
- Atrioventricular node
- Myocardium

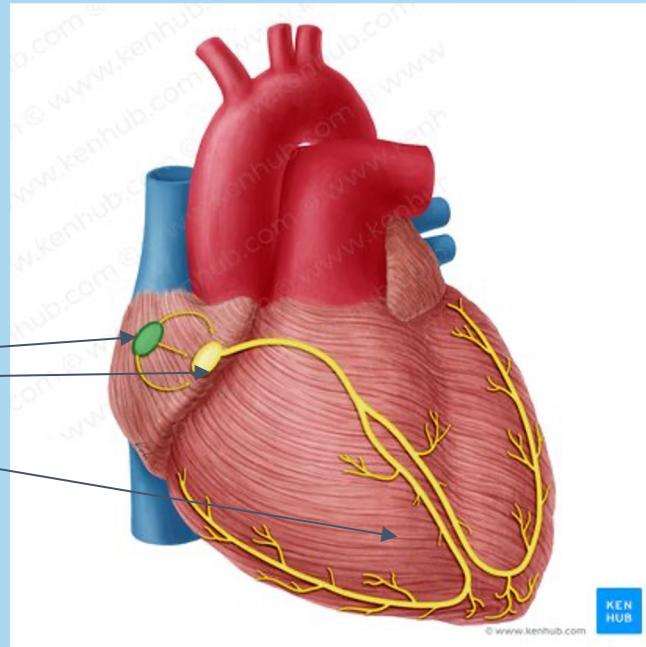
Cardioacceleratory center



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B1 ADRENERGIC RECEPTORS

Cardioacceleratory center



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- Myocardium

Increased contractility

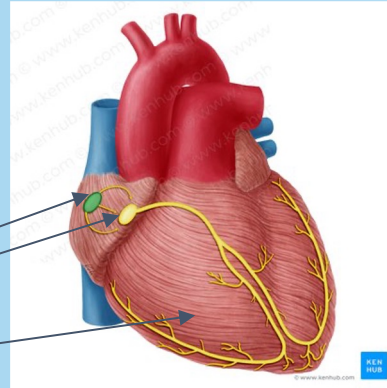


Increased cardiac output



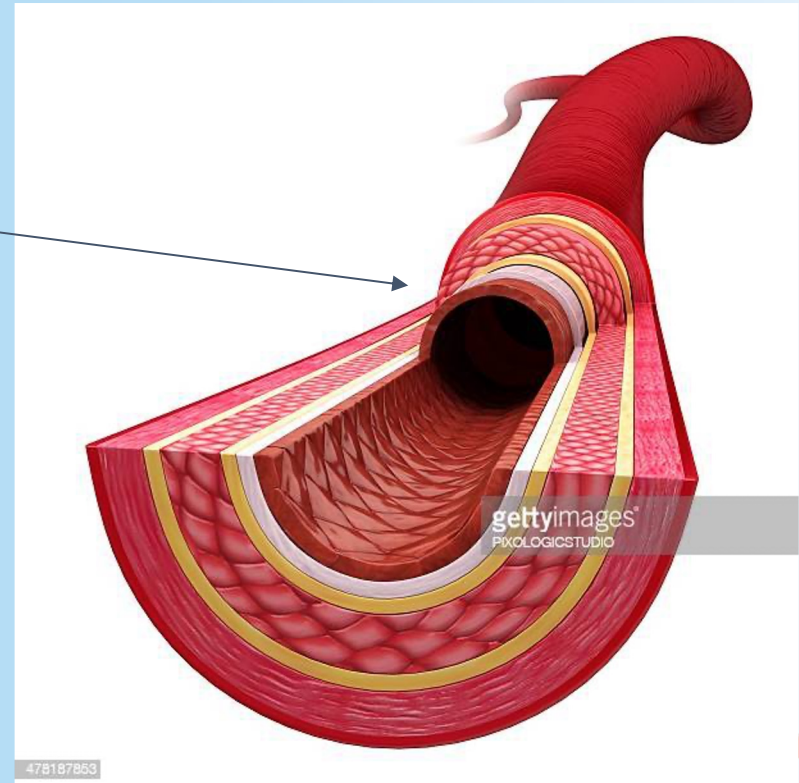
Increased blood pressure

Vasomotor center

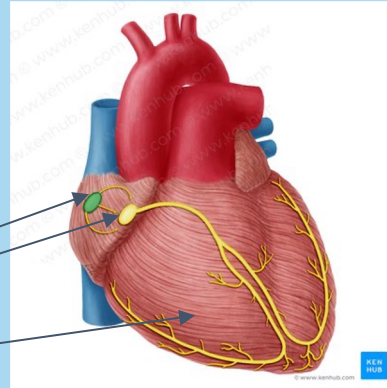


- Sinoatrial node
- Atrioventricular node
- Myocardium

- Blood vessels
 - Tunica media



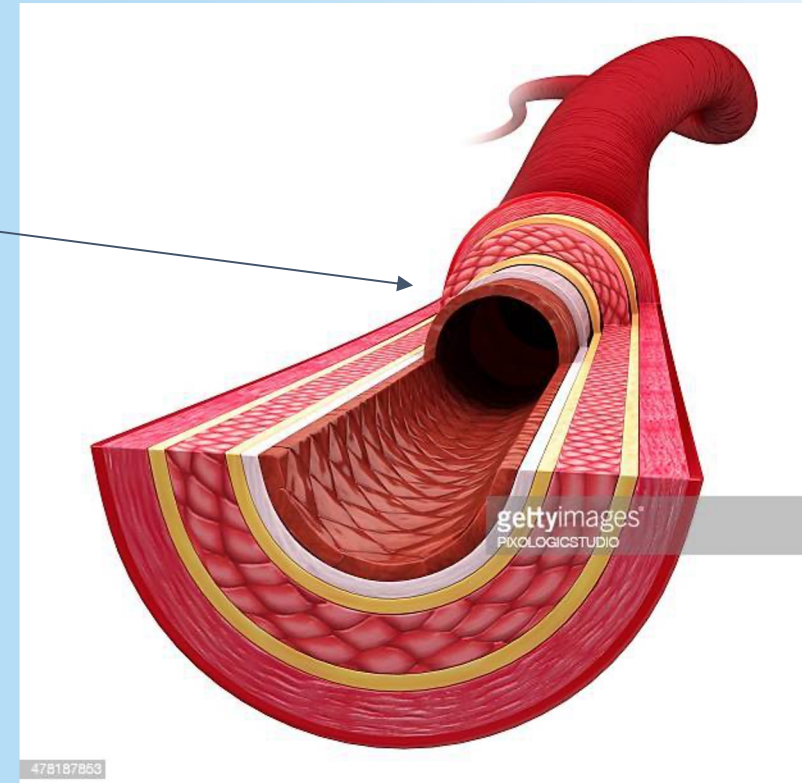
Vasomotor center



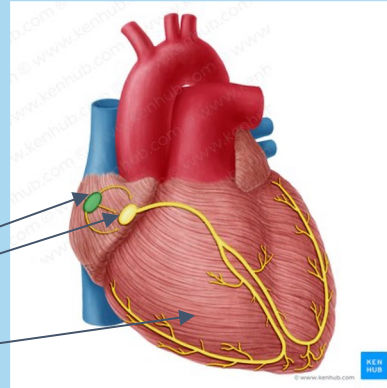
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A1 ADRENERGIC RECEPTORS



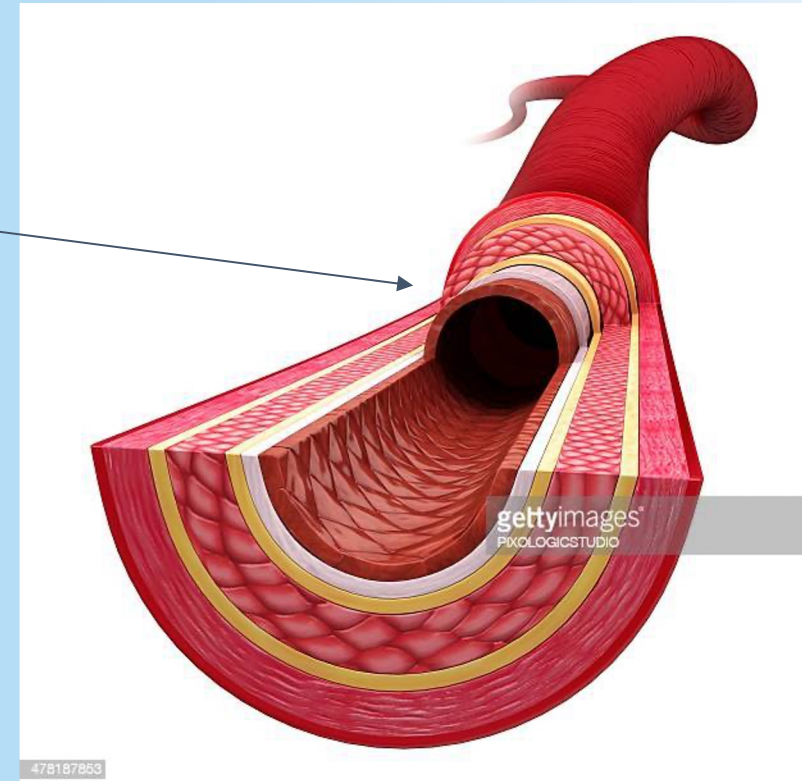
Vasomotor center



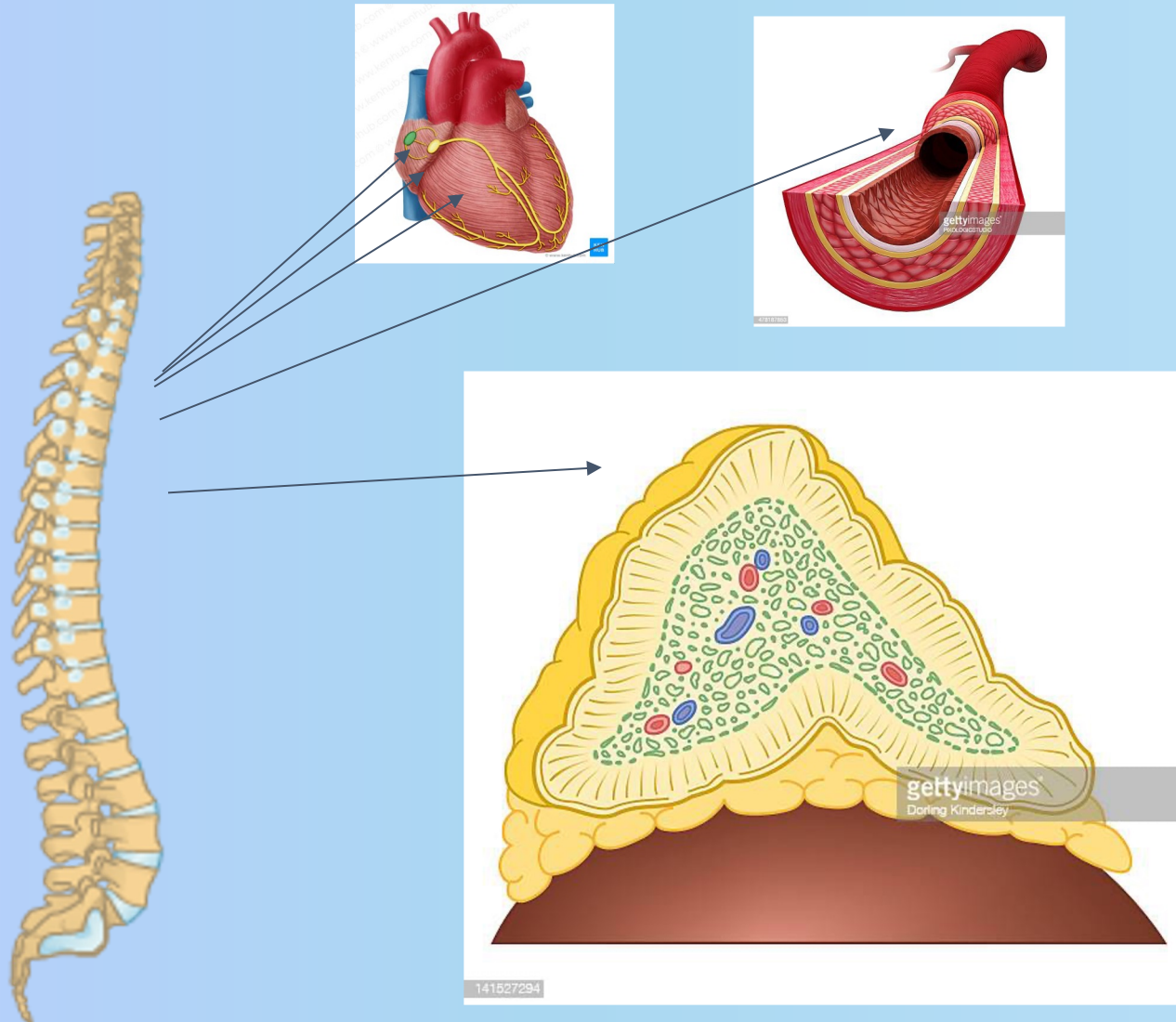
- Sinoatrial node
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- Myocardium

- Blood vessels
 - Tunica media

Decreased artery radius
↓
Increased total peripheral resistance
↓
Increased blood pressure



Adrenal medulla



- Chromaffin cells
 - Epinephrine
 - Norepinephrine

Renin Angiotensin Aldosterone System

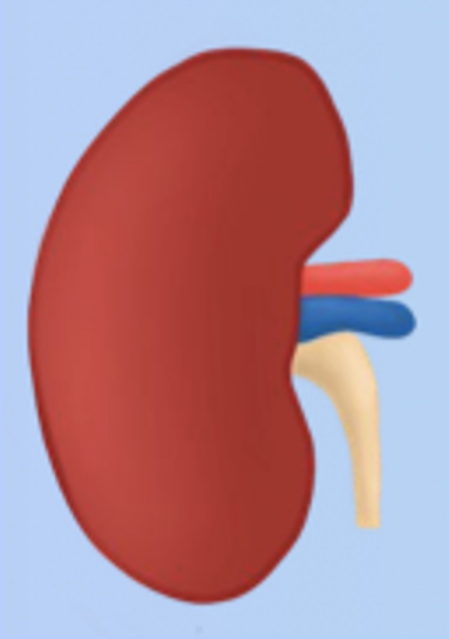
Kidneys



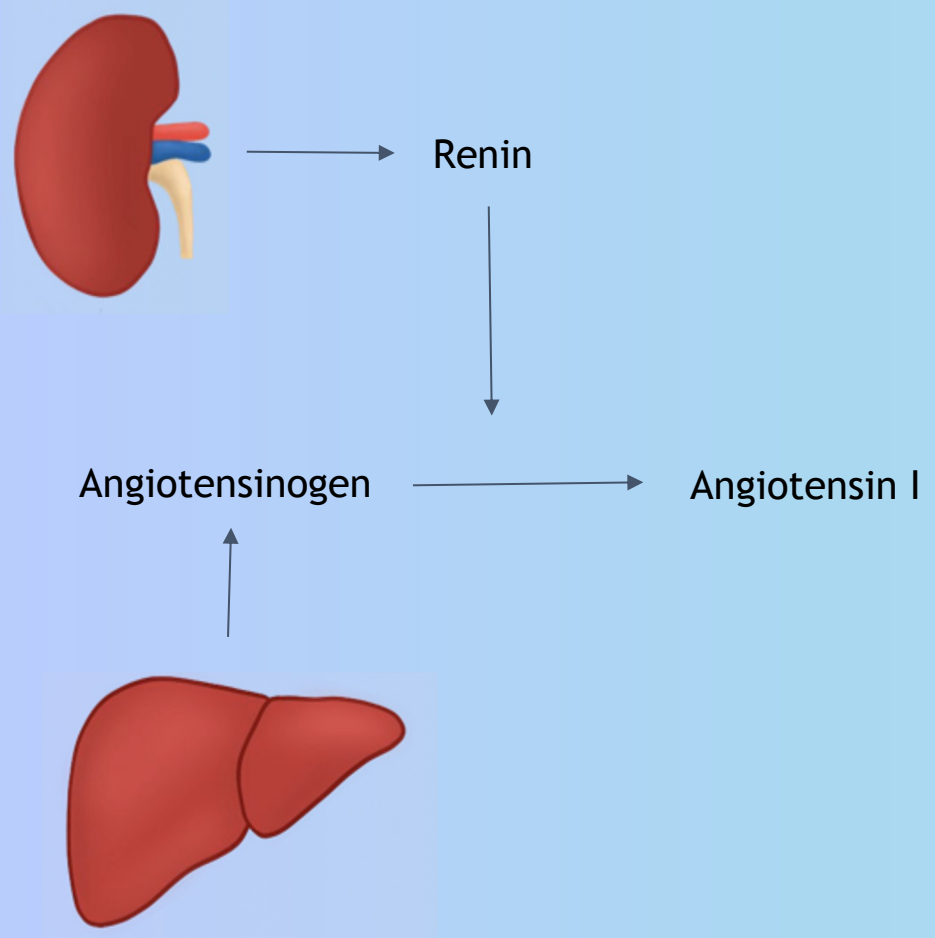
Juxtaglomerular cells



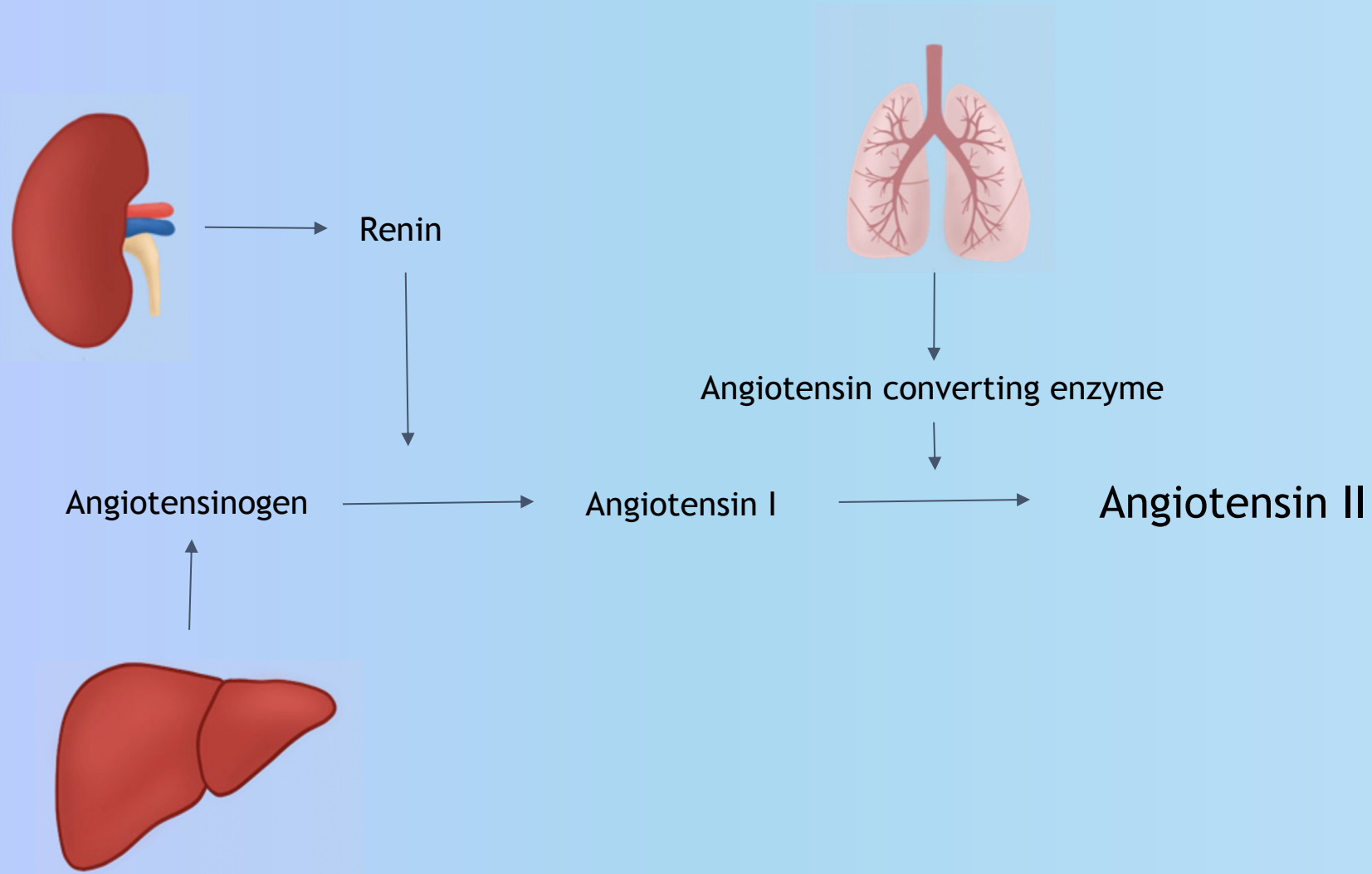
Renin

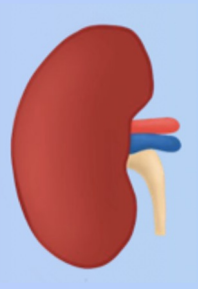


Renin Angiotensin Aldosterone System



Renin Angiotensin Aldosterone System





Angiotensin II

Aldosterone

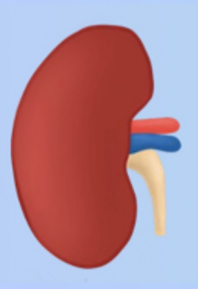
Zona glomerulosa cells



Distal convoluted tubule



Upregulation of sodium channels



Angiotensin II

Aldosterone

Zona glomerulosa cells



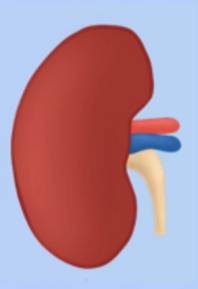
Distal convoluted tubule



Upregulation of sodium channels



WATER RETENTION



Angiotensin II

Aldosterone

Zona glomerulosa cells



Distal convoluted tubule



Upregulation of sodium channels



WATER RETENTION

Antidiuretic hormone

Posterior pituitary



Collecting duct



Upregulation of aquaporins



WATER RETENTION



What is blood pressure?



What happens when we have low blood pressure?



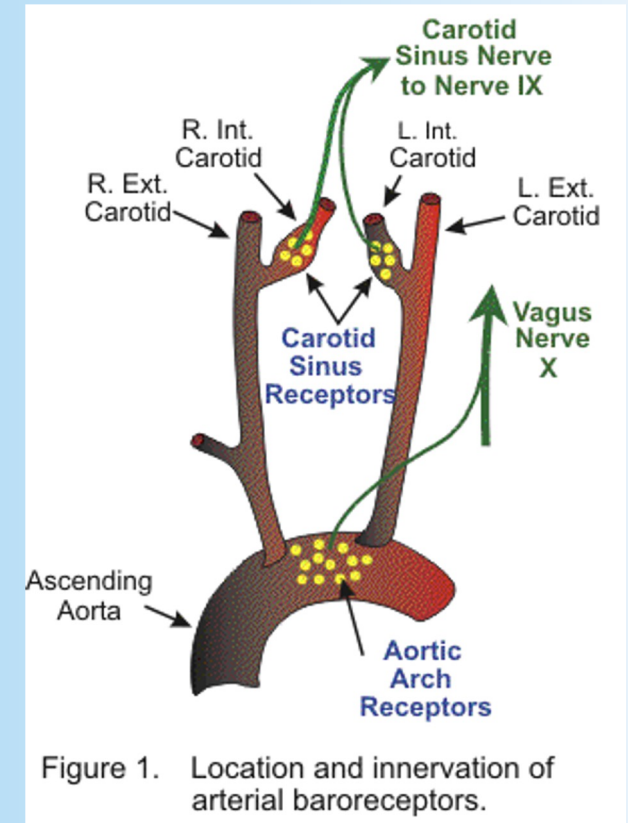
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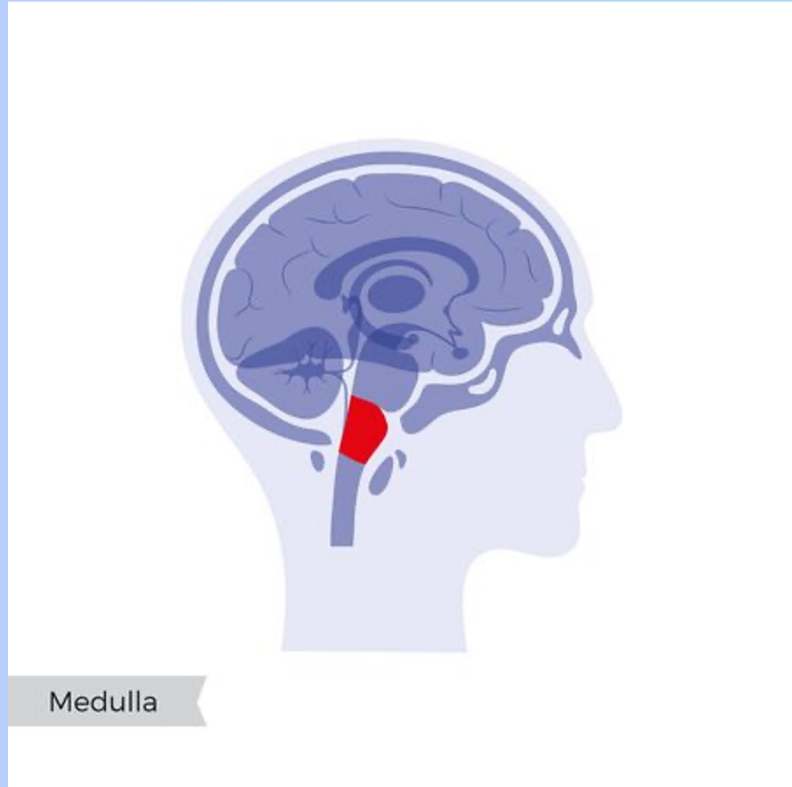
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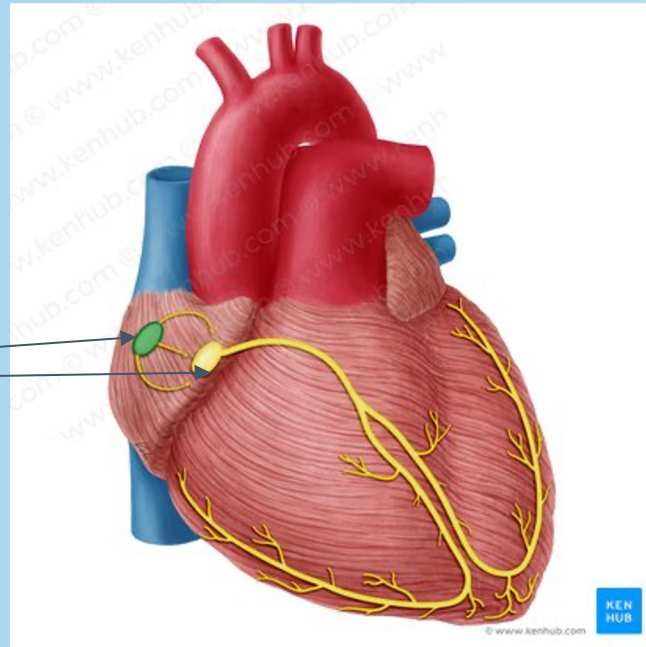


Nucleus Tractus Solitarius



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Cardioinhibitory center



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- Atrioventricular node

Decreased heart rate



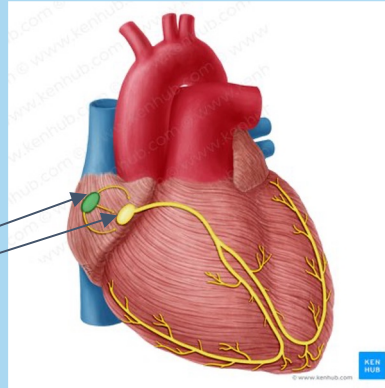
Decreased cardiac output



Decreased blood pressure

Vasomotor center

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- Atrioventricular node



- Blood vessels
 - Tunica media

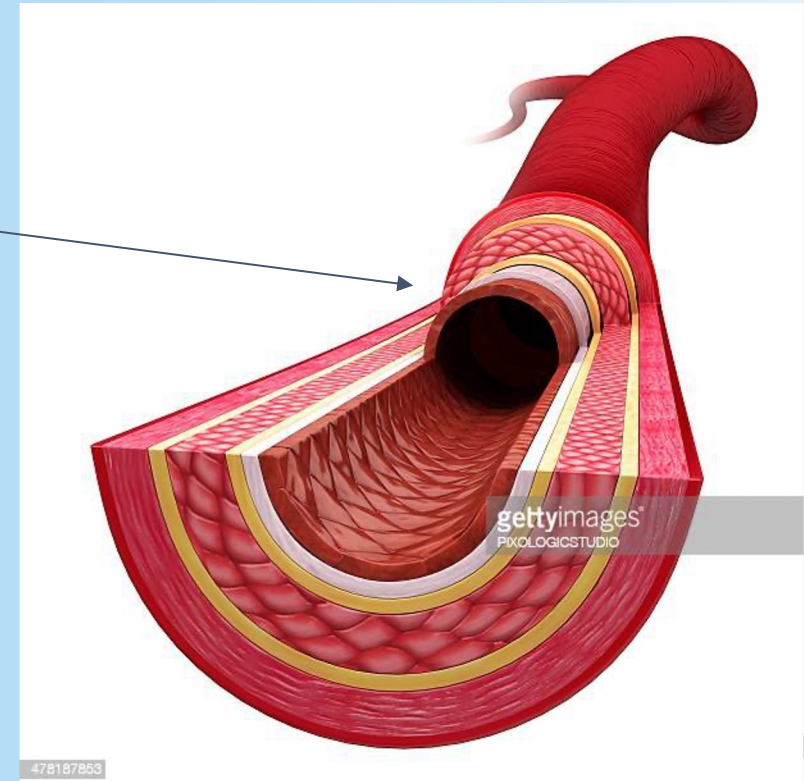
Increased artery radius



Decreased total peripheral resistance



Decreased blood pressure



Atrial Natriuretic Peptide

- Produced by atria in response to stretch

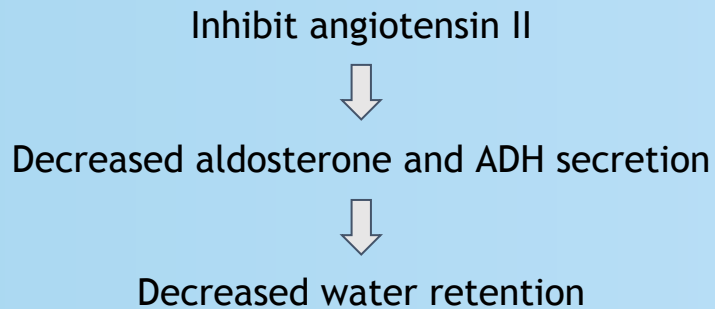
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Atrial Natriuretic Peptide

- Produced by atria in response to stretch





QUESTIONS?



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