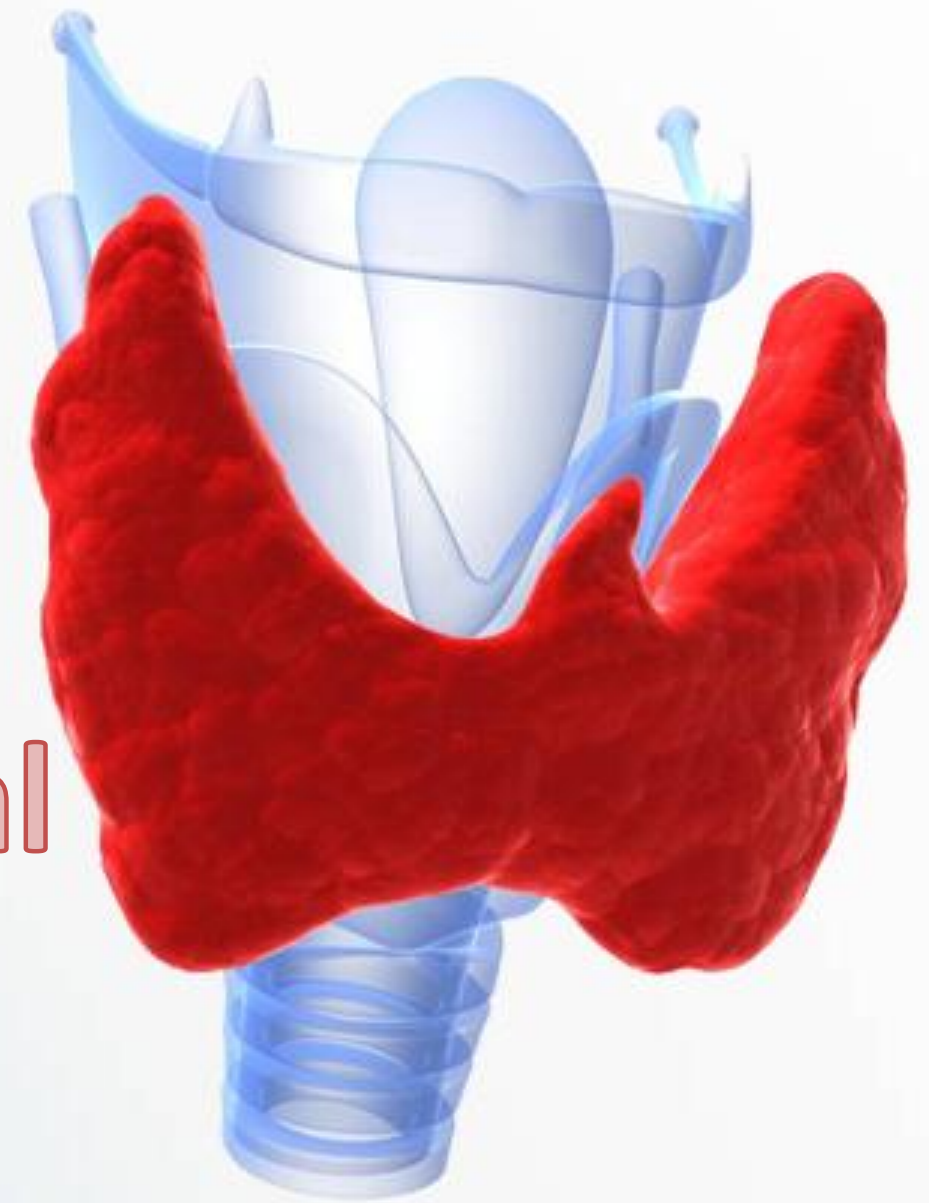




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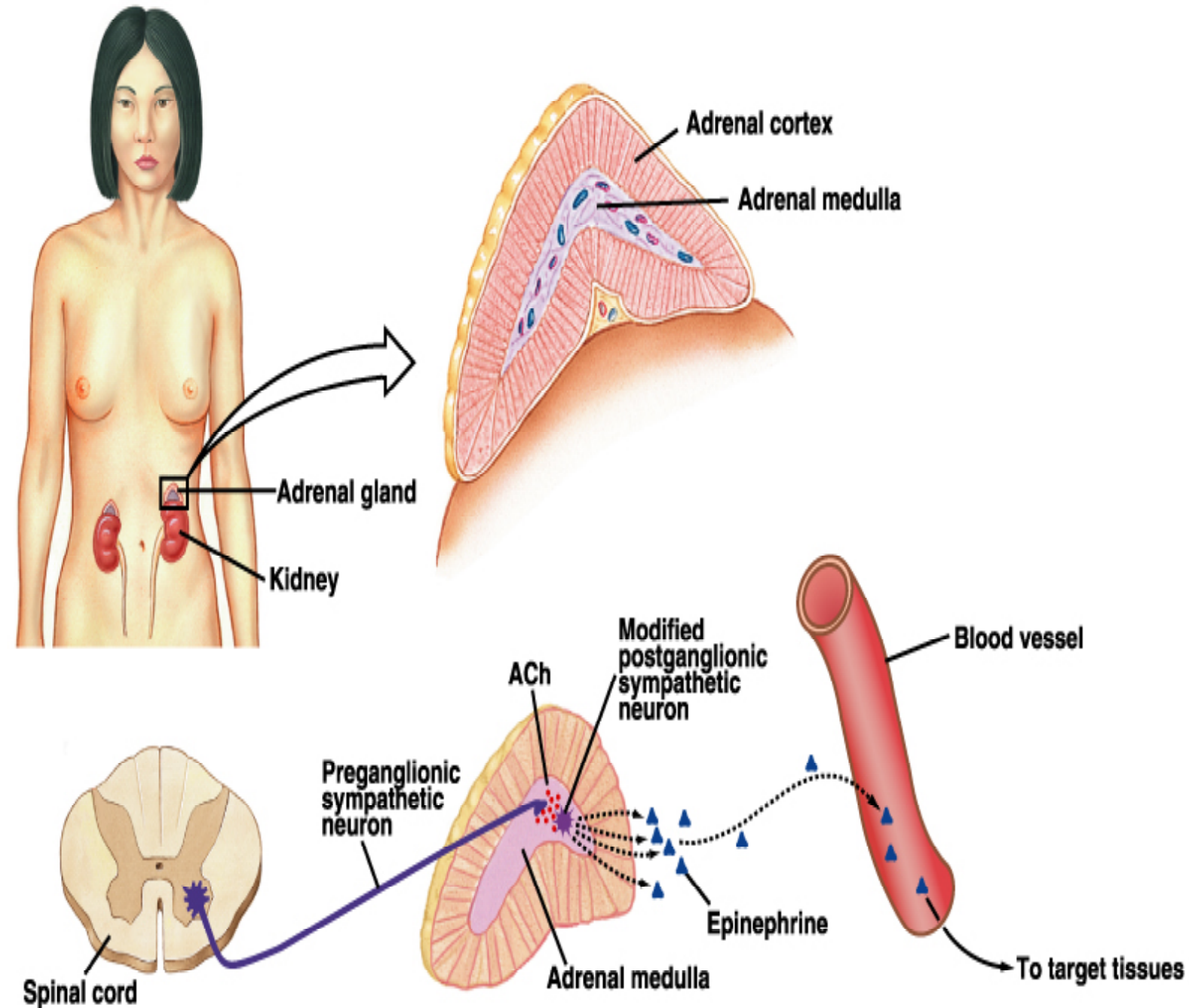
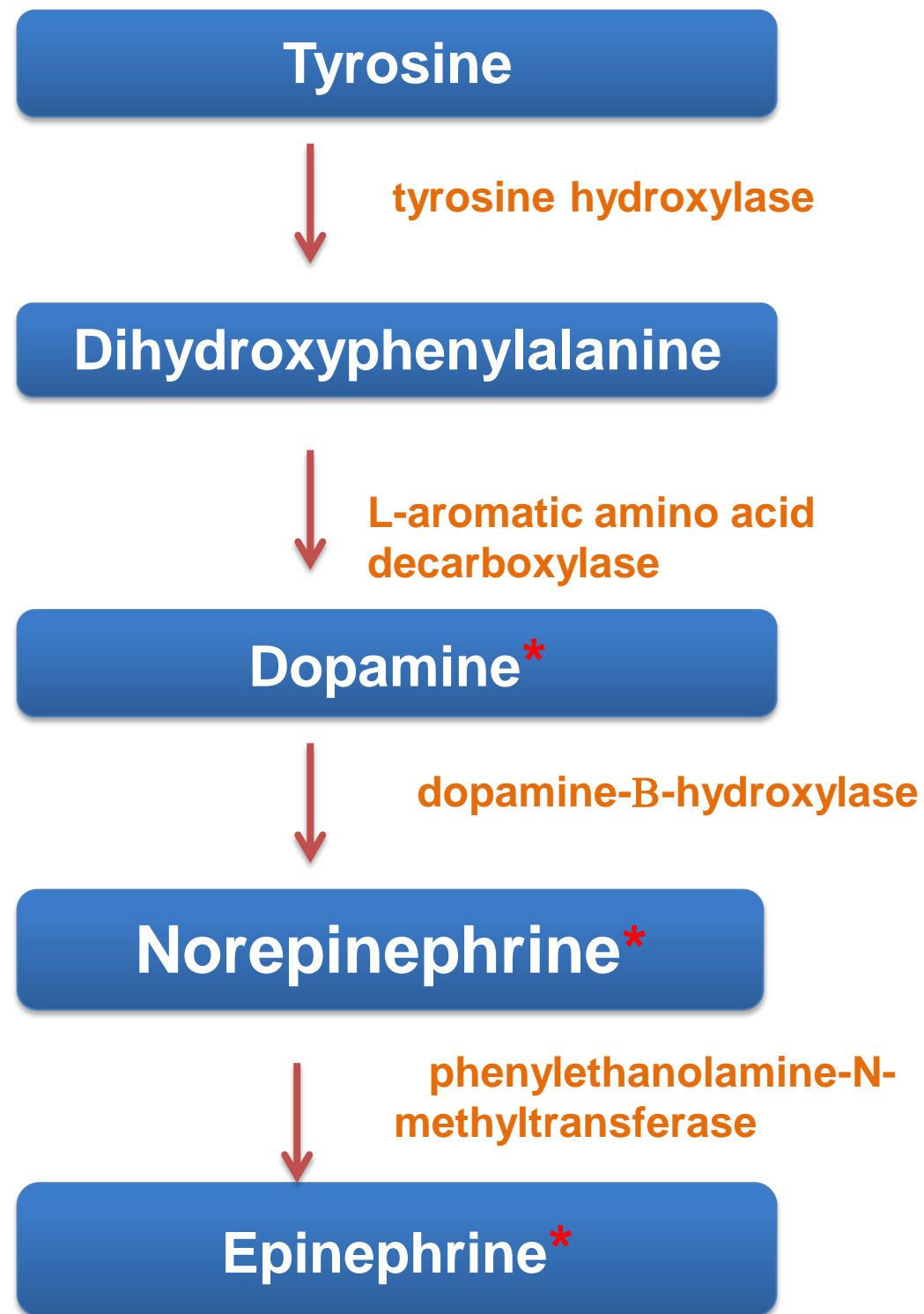
12 Physiology of adrenal medulla



**Sources:
Female slides**



Catecholamine synthesis



* Adrenal medulla hormones

Hormones of adrenal medulla

3 hormones :

- 1) Adrenaline (epinephrine)
- 2) Noradrenaline (norepinephrine)
- 3) Dopamin

- 80% of released catecholamine are Epinephrine.
- Hormones are released and stored in the adrenal medulla and released in response to appropriate stimuli.

Mechanism of Action

- **Receptor mediated** — adrenergic receptors. (alpha — beta)
- Peripheral effects are dependent upon the type and ratio of receptors in target tissues.
- **Norepinephrin** → works on **alpha** receptors more than beta => **mediates vasoconstriction**
- **Epinephrin** → works **equally** on both alpha — beta receptors.

Differences between Epinephrine and Norepinephrine

Epinephrine > norepinephrine

In terms of:

- Cardiac stimulation → leading to greater cardiac output (β stimulation).
- Increasing metabolism.

Epinephrine < norepinephrine

In terms of :

- Constriction of blood vessels → leading to increased peripheral resistance — **increased arterial pressure.**

Effects of Epinephrine

Metabolism

- Glycogenolysis in liver and skeletal muscle → can lead to hyperglycemia.
- Mobilization of free fatty acids,
- Increase metabolic rate.
- Increases O_2 consumption.

Cardiovascular



- Heart rate & cardiac contractility
- BP

Respiration



Oxygen consumption & respiratory rate

Pheochromocytoma

Definition	<ul style="list-style-type: none">• A catecholamine-secreting tumor of chromaffin cells of the adrenal medulla.• <u>Adrenal</u> pheochromocytoma (90%) - Extra-adrenal pheochromocytoma.
Signs and Symptoms	<ul style="list-style-type: none">• resistant hypertension. (95%)• headache.• sweating.• palpitations.• chest pain.• anxiety.• glucose intolerance.• increased metabolic rate. <p>} classic triad</p>
Diagnosis	<ul style="list-style-type: none">• High plasma catecholamine.• Increased metabolites [VMA]* in urine.• Imaging.
Treatment	Surgical resection.

* (VMA) Vanillyl mandelic acid: Is an end-stage metabolite of the catecholamines → 24h urine levels of catecholamines & metabolites → **high VMA levels indicate pheochromocytoma**

Summery

- Hormones of the adrenal medulla are **epinephrine** 80% & **NE**.
- They are secreted and stored in the adrenal medulla.
- NE has alpha receptors n the periphery more than beta, while epinephrine has alpha & beta receptors equally.
- NE has vasoconstriction effect & epinephrine increase cardiac output & metabolism .
- pheochromocytoma is a catecholamine secreting hormones.
- Resistant hypertension, headache & sweating are the sign of it.
- Treatment is surgical.

MCQs

1/ catecholamine synthesis beginning of :

- A-dopamine
- B-adrenaline
- C-tyrosine
- D-ACH

2/epinephrine is increase Cardiac output by stimulation of which receptor:

- A- Alpha adrenergic receptor
- B- Beta adrenergic receptor

3/ NE increase blood pressure by :

- A-increase cardiac output
- B-increase peripheral resistance
- C-increase metabolic rate
- D-decrease oxygen consumption

4/increase of glycogenolysis can lead to:

- A-hyperglycemia
- B-hypoglycemia
- C-hypertension
- D-hypotension

5/ the percentage of adrenal pheochromocytoma is:

- A-10%
- B-50%
- C-45%
- D-90%

6/ Pheochromocytoma is a tumor of which cells :

- A-lymphocytes
- B-macrophages
- C-chromaffin cells
- D-neurons

1- C 2- B 3- B 4- A 5- D 6- C



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Endocrine Block