

# Antihypertensive Drugs

By

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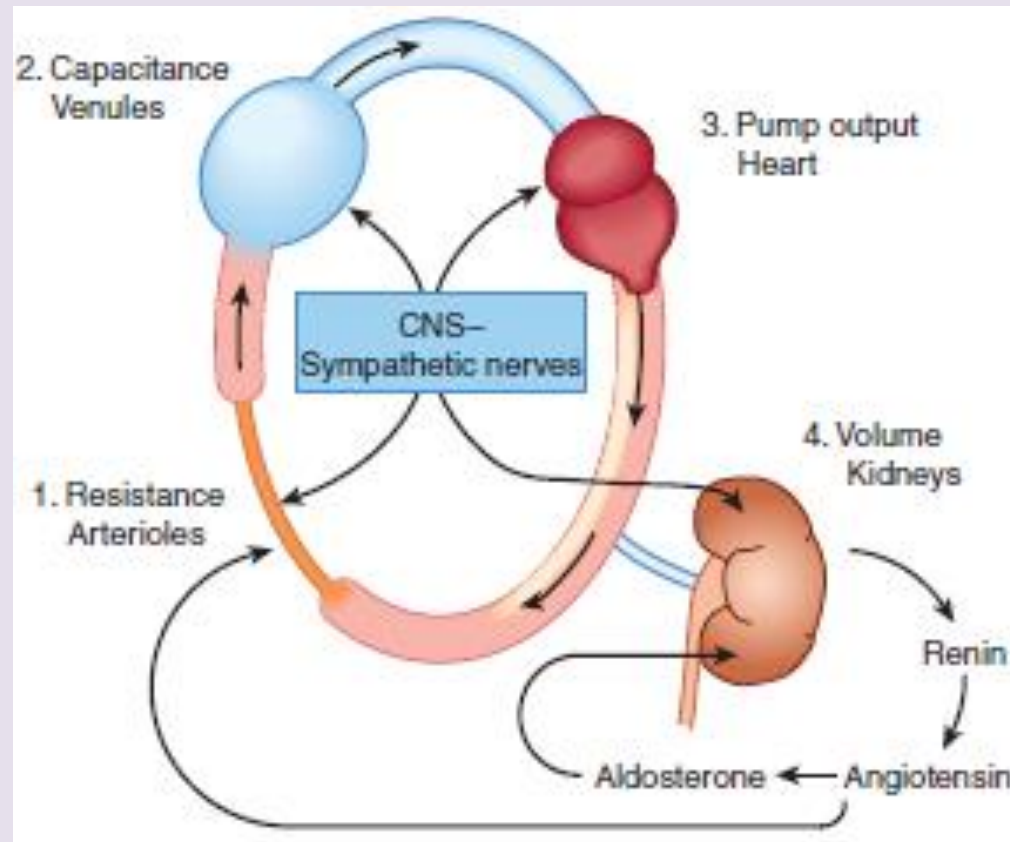
# Hypertension

- **Hypertension (HTN)** is defined as either a sustained systolic blood pressure of greater than 140 mm Hg or a sustained diastolic blood pressure of greater than 90 mm Hg.

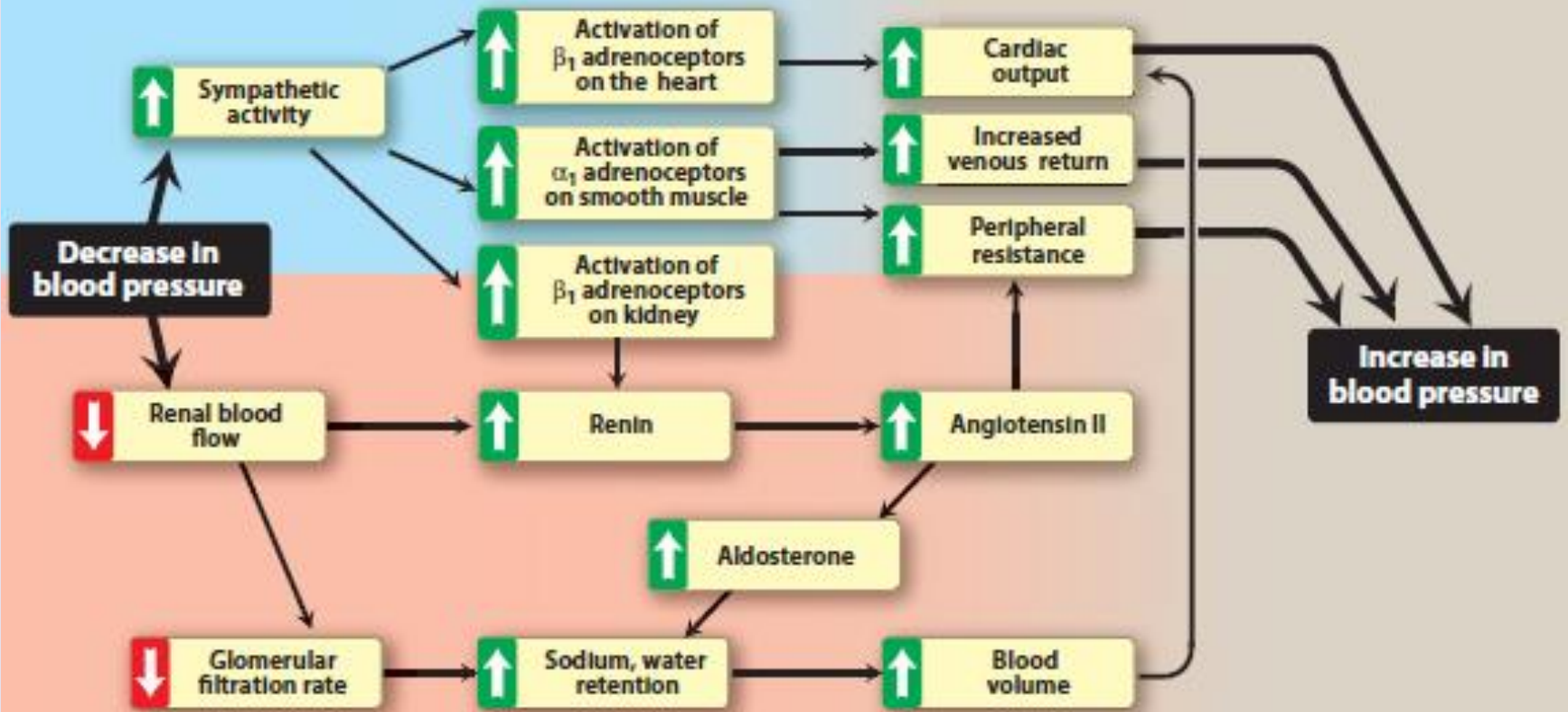
Systolic/Diastolic Pressure (mm Hg)	Category
< 120/80	Normal
120–135/80–89	Prehypertension
≥ 140/90	Hypertension
140–159/90–99	Stage 1
≥ 160/100	Stage 2

# Normal regulation of blood pressure

- **BP = CO X PVR**



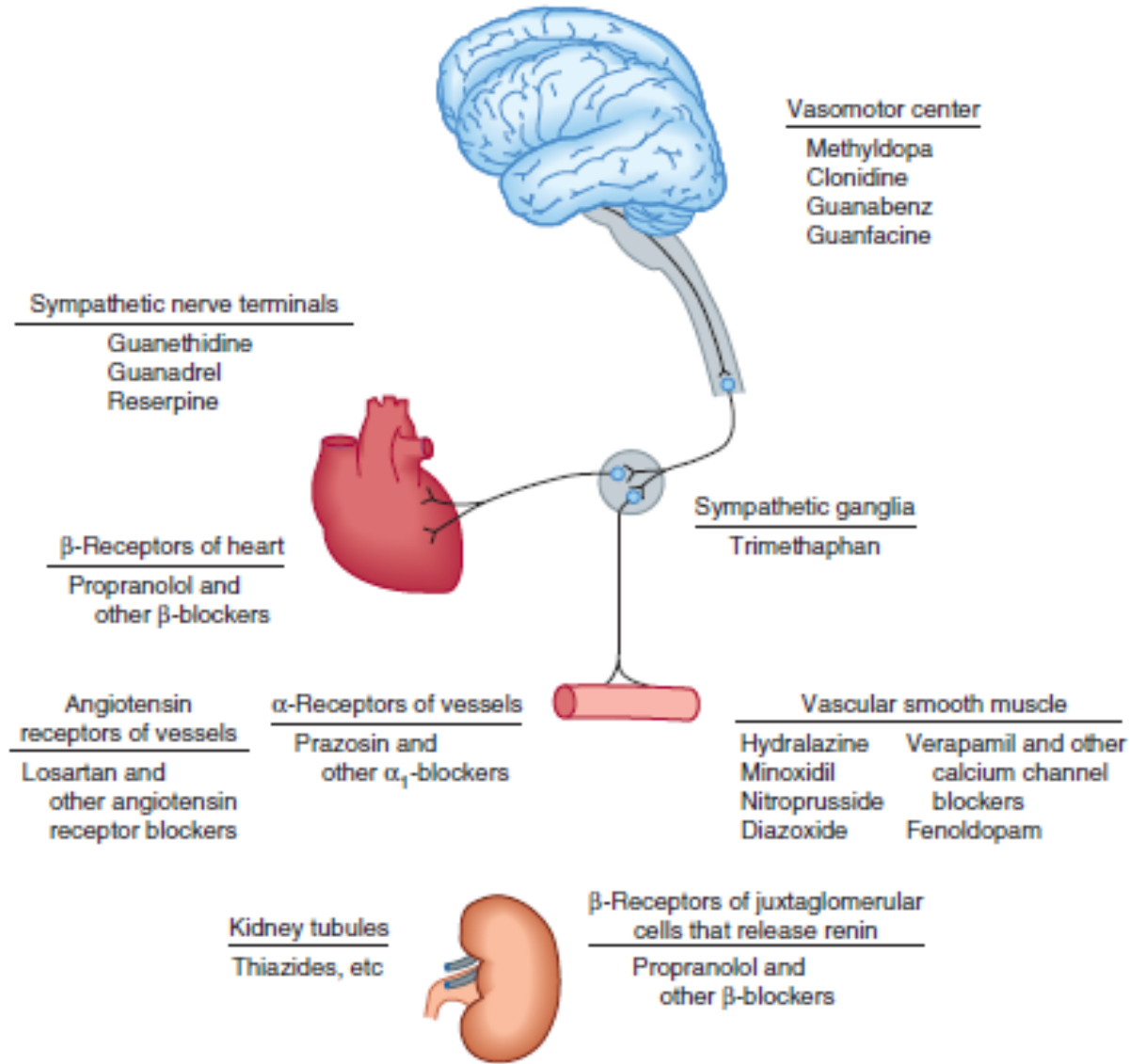
### Response mediated by the sympathetic nervous system



### Response mediated by the renin-angiotensin-aldosterone system

# Antihypertensive drugs

1. Sympathoplegic agents.
2. Diuretics.
3. Drugs affecting angiotensin.
4. Direct vasodilators.



# 1. Sympathoplegic agents

- I. Centrally acting agents.
- II. Adrenergic neuron blocking agents.
- III. Adrenoceptor antagonists.

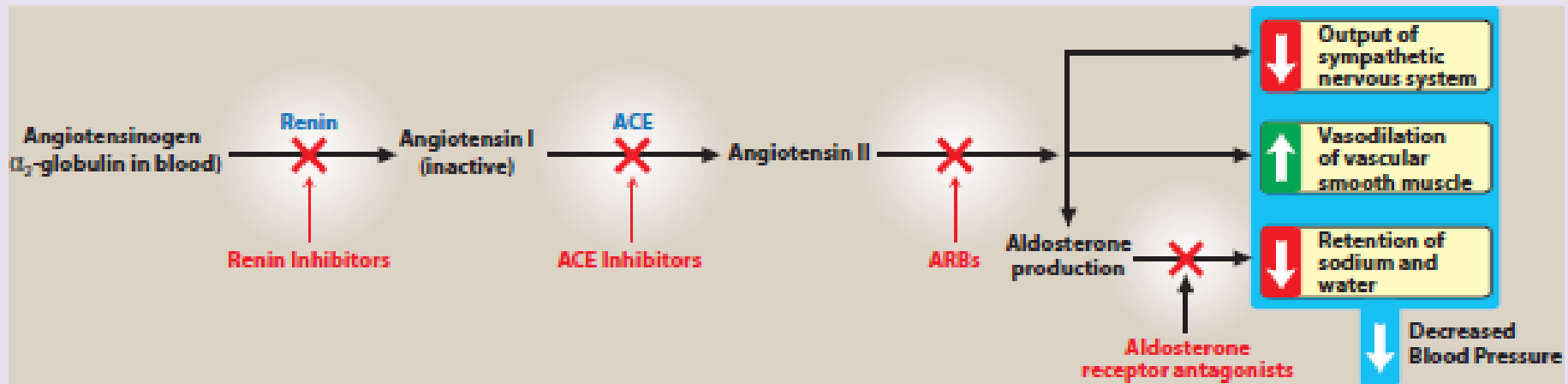
## 2. Diuretics

- Thiazide diuretics.
- Loop diuretics.
- Potassium sparing diuretics.



# 3. Drugs affecting angiotensin

- I. ACE inhibitors.
- II. ARBs.
- III. Direct renin inhibitors.



## 4. Direct vasodilators

- Decreased incidence of orthostatic hypotension/sexual dysfunction is observed with direct vasodilators, why?
- Most vasodilators cause headache , flushing , tachycardia , hypotension and nausea.

# Calcium channel blockers

- **Dihydropyridines**: Nifedipine , Amlodipine , Nislodipine , Nicardipine , Isradipine , Felodipine and Nimodipine.
- **Non-dihydropyridines**: Verapamil and Diltiazem.

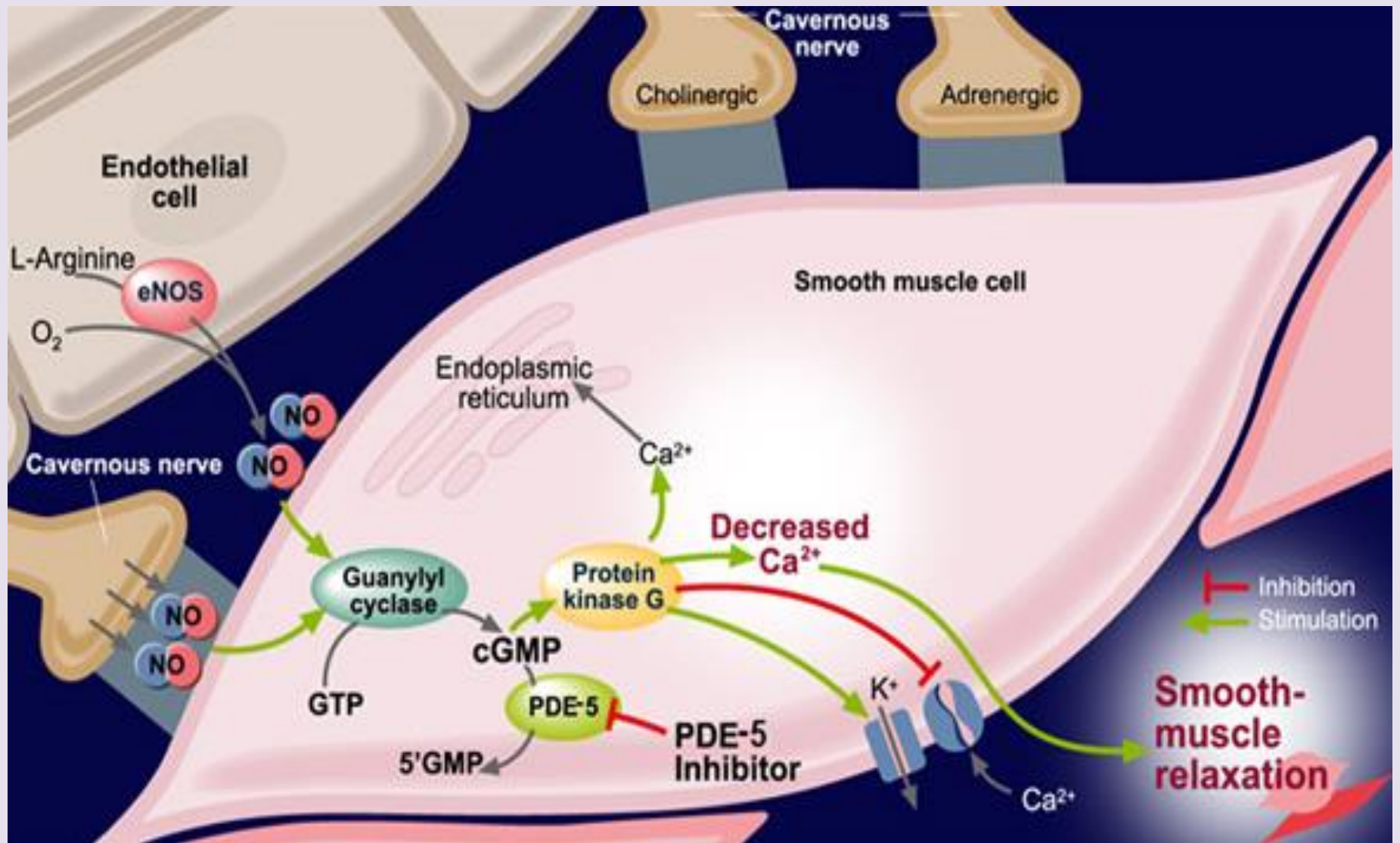
- What is the major difference between dihydropyridines and non-dihydropyridines ?

Adverse effects :-

- ***Dihydropyridines***: headache & peripheral oedema.
- ***Non-dihydropyridines***: AV block , constipation.

# Hydralazine

- Orally active agent used in severe HTN and HTN during pregnancy.
- MOA :  $\uparrow$  NO release ,  $K^+$  channel opener.
- Toxicity: may provoke angina and MI , why?



# Minoxidil

- Orally active agent mainly reserved to replace hydralazine in severe HTN not managed by hydralazine or in patients with renal failure.
- MOA: K<sup>+</sup> channel opener.
- S/E : Hypertrichosis (used topically to stimulate hair growth).

# Diazoxide

- Used in emergency HTN.
- MOA: K<sup>+</sup> channel opener.
- S/E : hyperglycemia (↓ insulin release , also indicated in patients with chronic hypoglycemia secondary to insulinoma).



# Sodium Nitroprusside

- Used in emergency HTN (also dilate veins).
- MOA: ↑ NO release or via direct stim. of cGMP.
- Toxicity : cyanide accumulation , metabolic acidosis and arrhythmias.

# Fenoldopam

- D<sub>1</sub>-receptor agonist used in emergency hypertension.

# Homework

- Read about pharmacological treatment of pulmonary hypertension.

Thank you

# References

- Basic & Clinical Pharmacology , Bertram G. Katzung  
12<sup>th</sup> edition .
- Lippincott's Illustrated Reviews: Pharmacology ,  
5<sup>th</sup> edition .
- Goodman & Gilman's The Pharmacological Basis of  
Therapeutics, 12<sup>th</sup> ed. .