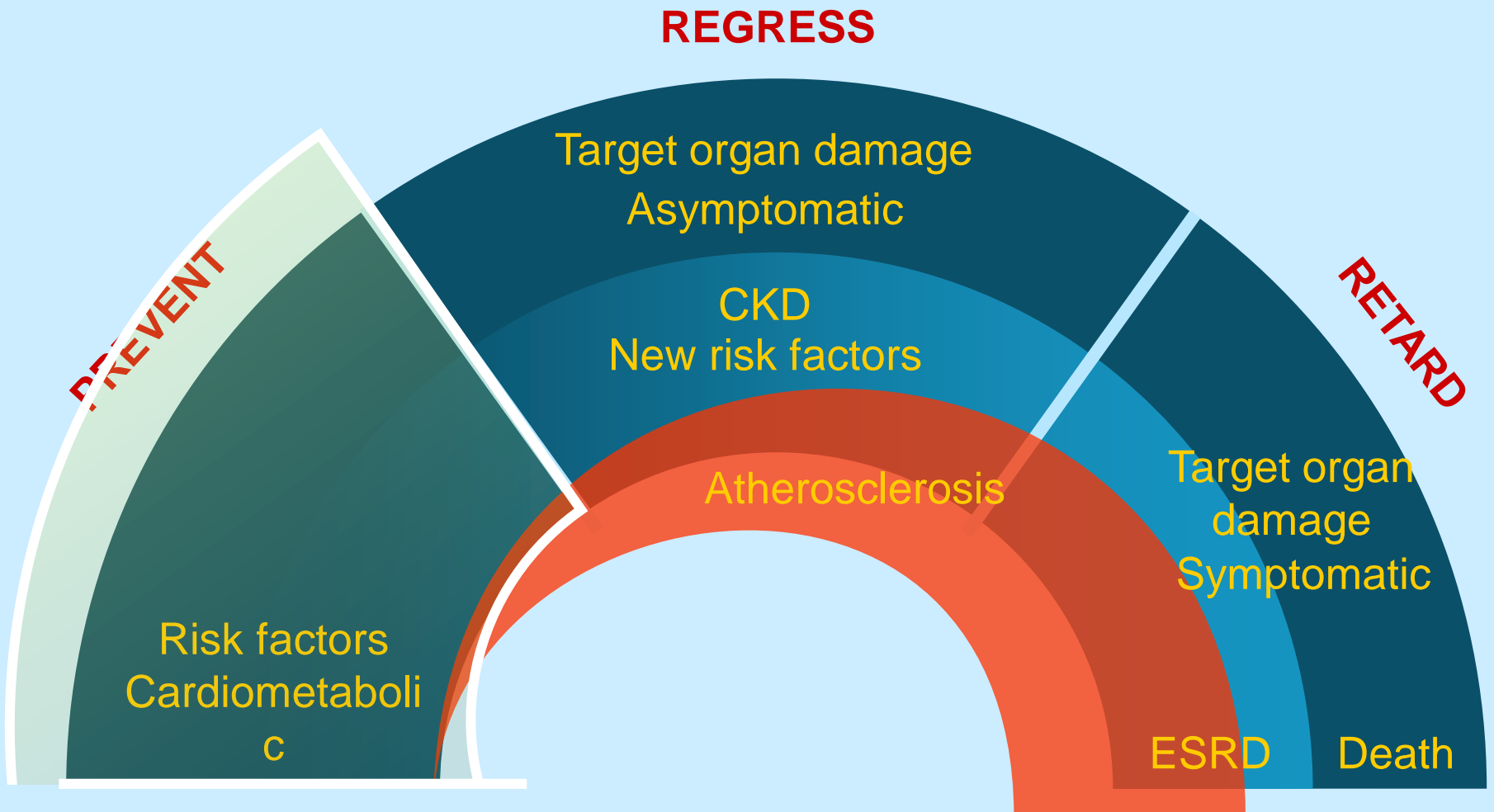


An anatomical illustration of the human torso, focusing on the cardiovascular and renal systems. The heart is shown in the center, with its four chambers and major blood vessels (aorta, pulmonary artery, pulmonary veins, and vena cava) clearly visible. The lungs are shown on either side of the heart, with their branching bronchial and vascular structures. Below the heart, the kidneys are depicted, connected to the ureters and the bladder. The entire illustration is rendered in a blue and red color scheme, with the heart and major vessels in red and the lungs and surrounding structures in blue. The background is a solid blue color.

# Vai trò New Generation CCB trong Hệ Tim-Thận & Tăng Huyết Áp

- Prof. Phạm Văn Bùi
- BV Nguyễn Tri Phương
- ĐH YK Phạm Ngọc Thạch
- GS Thỉnh giảng ĐH Liège , Belgium
- Chủ tịch Hội Thận-Lọc Máu, Tp HCM

# Cardio-renal Continuum



# Renal and Cardiovascular Disease are Interconnected

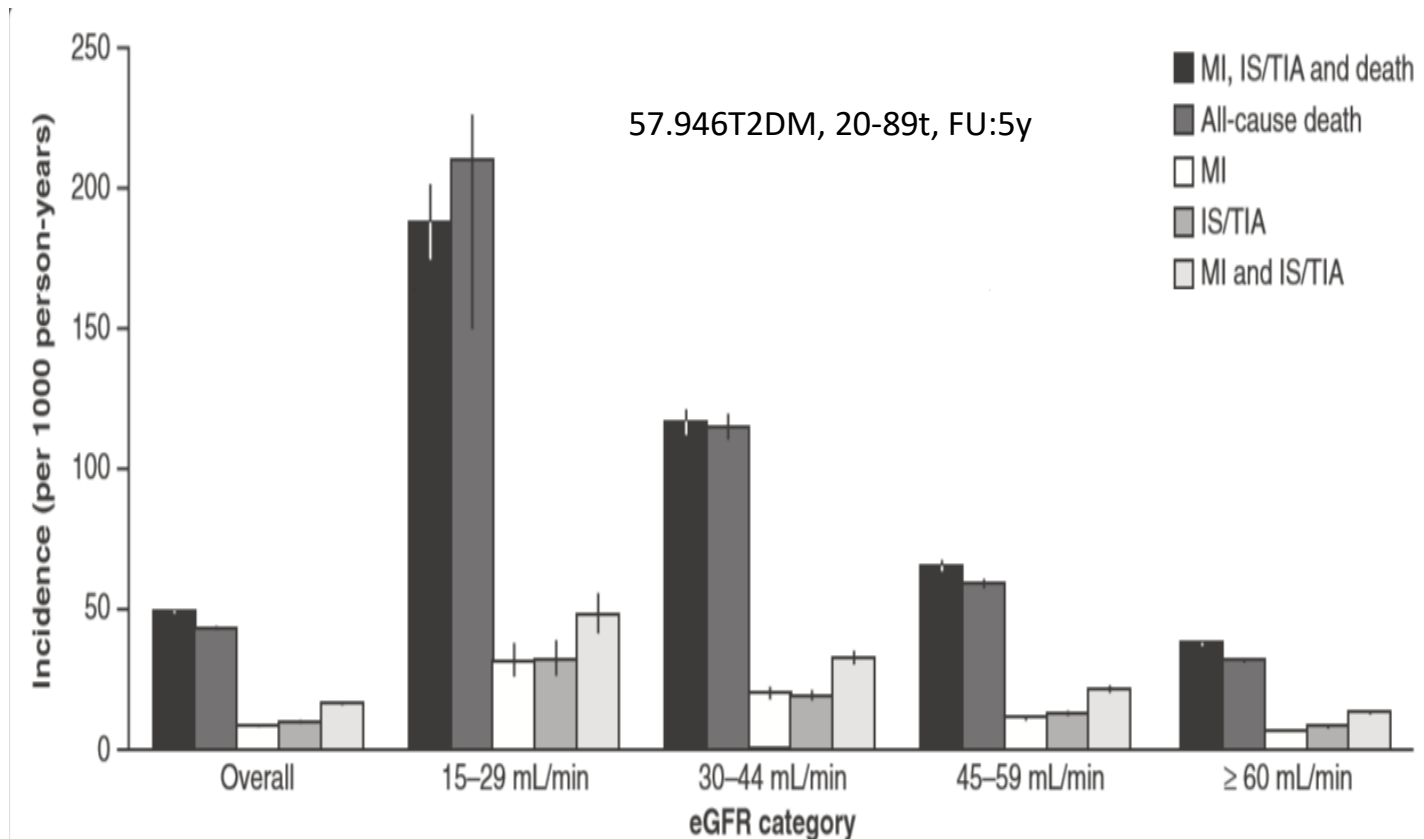
- Renal and cardiac systems are inextricably linked; acute or chronic disorder of one can induce dysfunction in the other<sup>1</sup>



- Elderly CKD patients are more likely to die of heart disease than advance to ESRD<sup>2</sup>

**Renal and cardiac systems should be considered together**





**Figure 1** Incidence rates of death, myocardial infarction (MI) and ischemic stroke (IS)/transient ischemic attack (TIA). Incidence rates are shown both overall and according to estimated glomerular filtration rate (eGFR) category. Black vertical lines represent 95% confidence intervals.

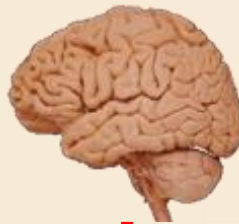
# Update on Immune System Activation in the Pathogenesis of Hypertension

- BP regulated by the integrated function of :

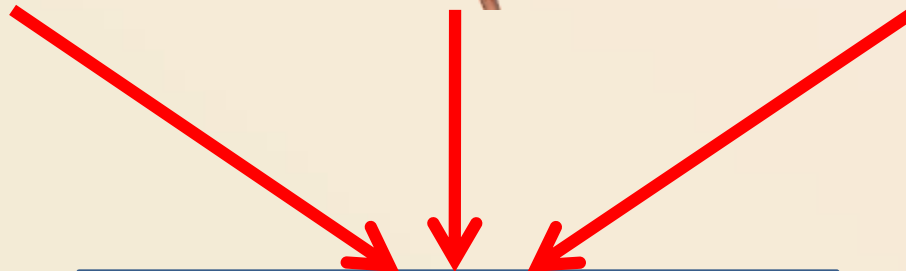
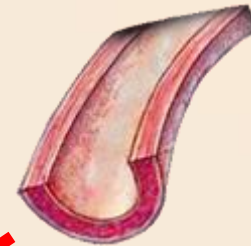
Kidneys



Central Nervous System

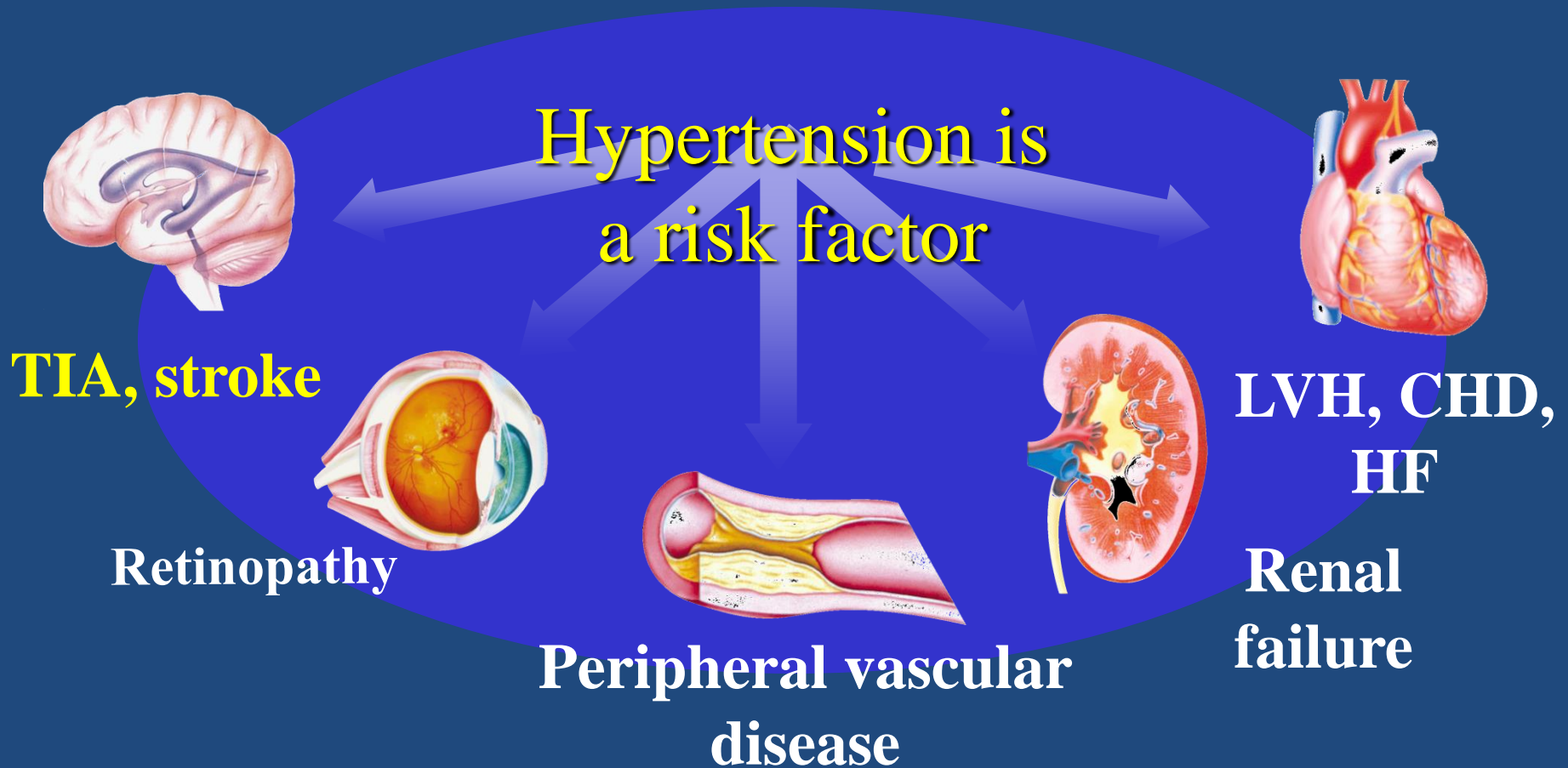


Vasculature



**HYPERTENSION**

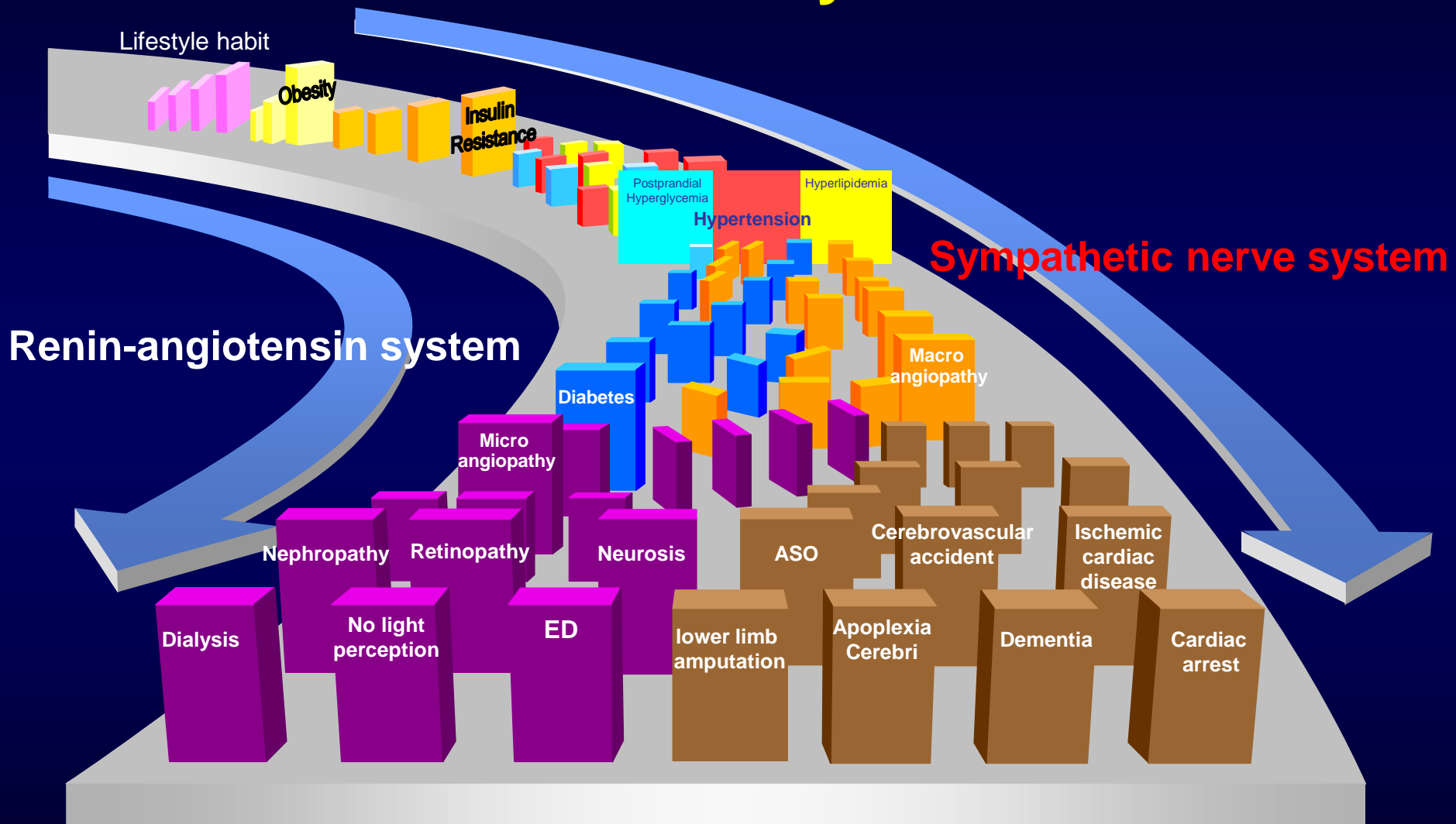
# Complications of Hypertension:



TIA = transient ischemic attack; LVH = left ventricular hypertrophy; CHD = coronary heart disease; HF = heart failure.

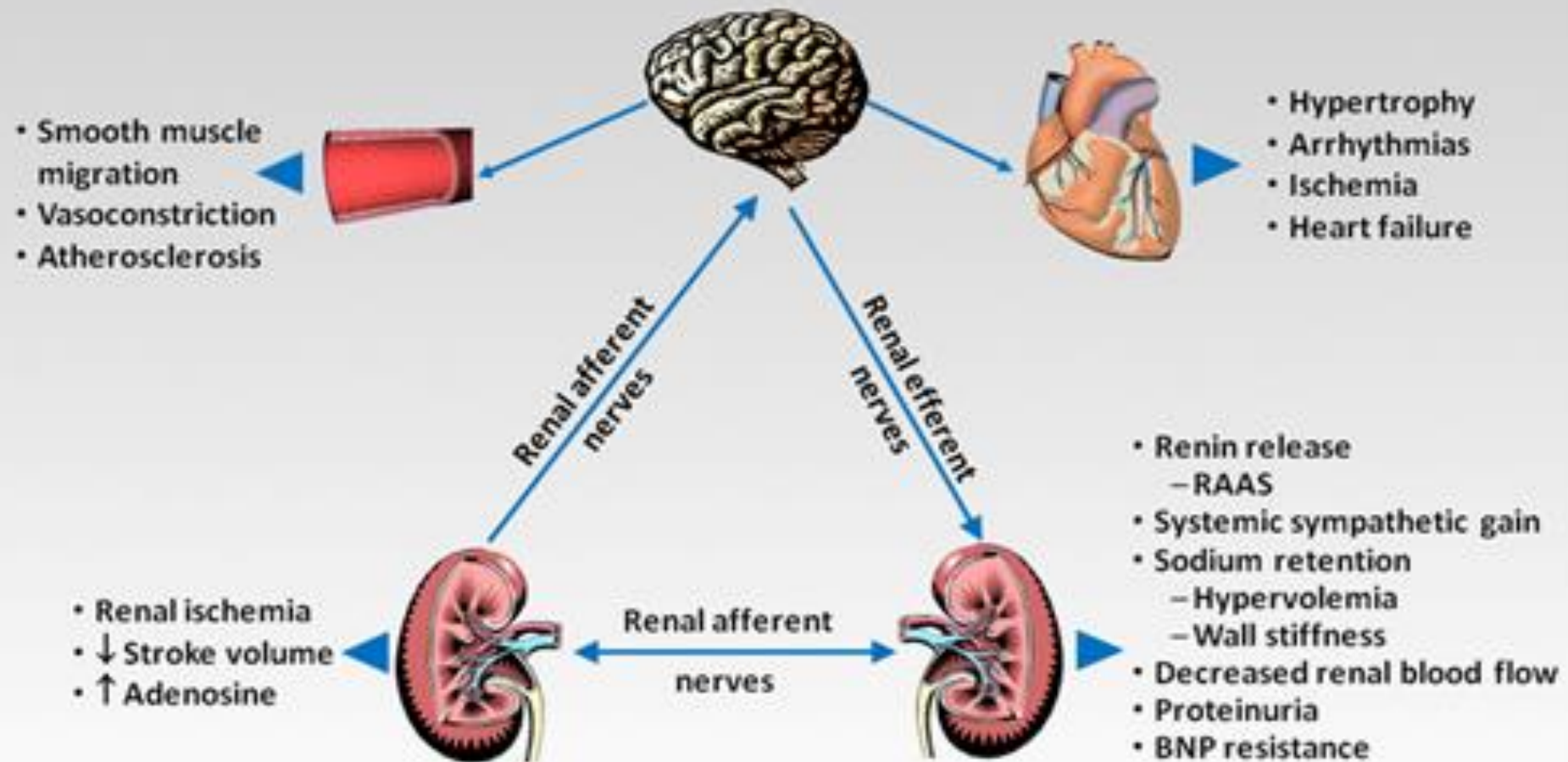
Cushman WC. *J Clin Hypertens*. 2003;5(Suppl):14-22.

# Concept of Metabolic Domino effect in metabolic syndrome





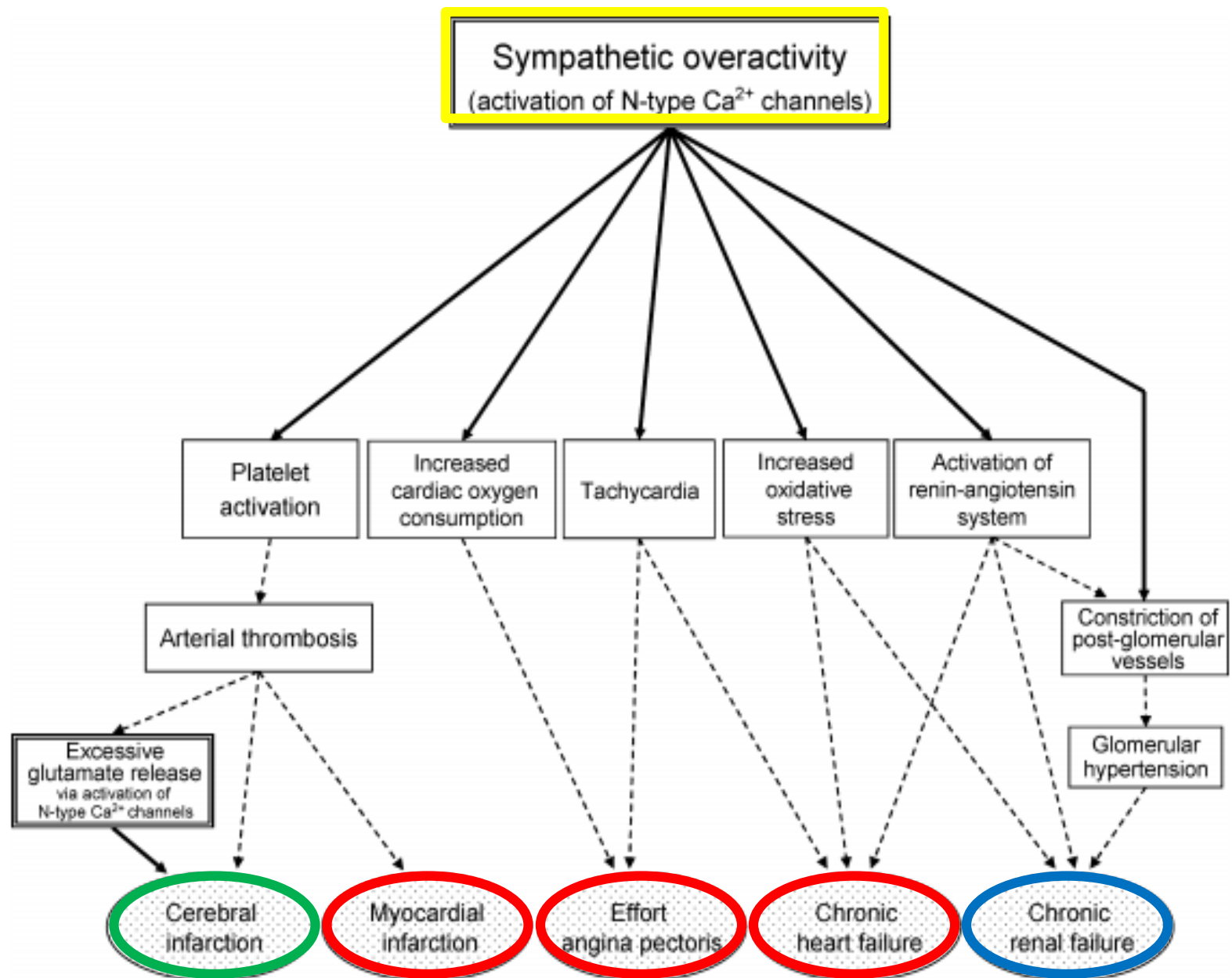
# Renal Sympathetic Activation in Hypertension



BNP = brain natriuretic peptide; RAAS = renin-angiotensin-aldosterone system

From Krum H, et al. *Circulation*. 2011;123;209-215.  
Republished with permission.





**Figure 2** Schema of relation of N-type  $\text{Ca}^{2+}$  channels to major complications of hypertension.



Different organs behave differently to decrease in BP:

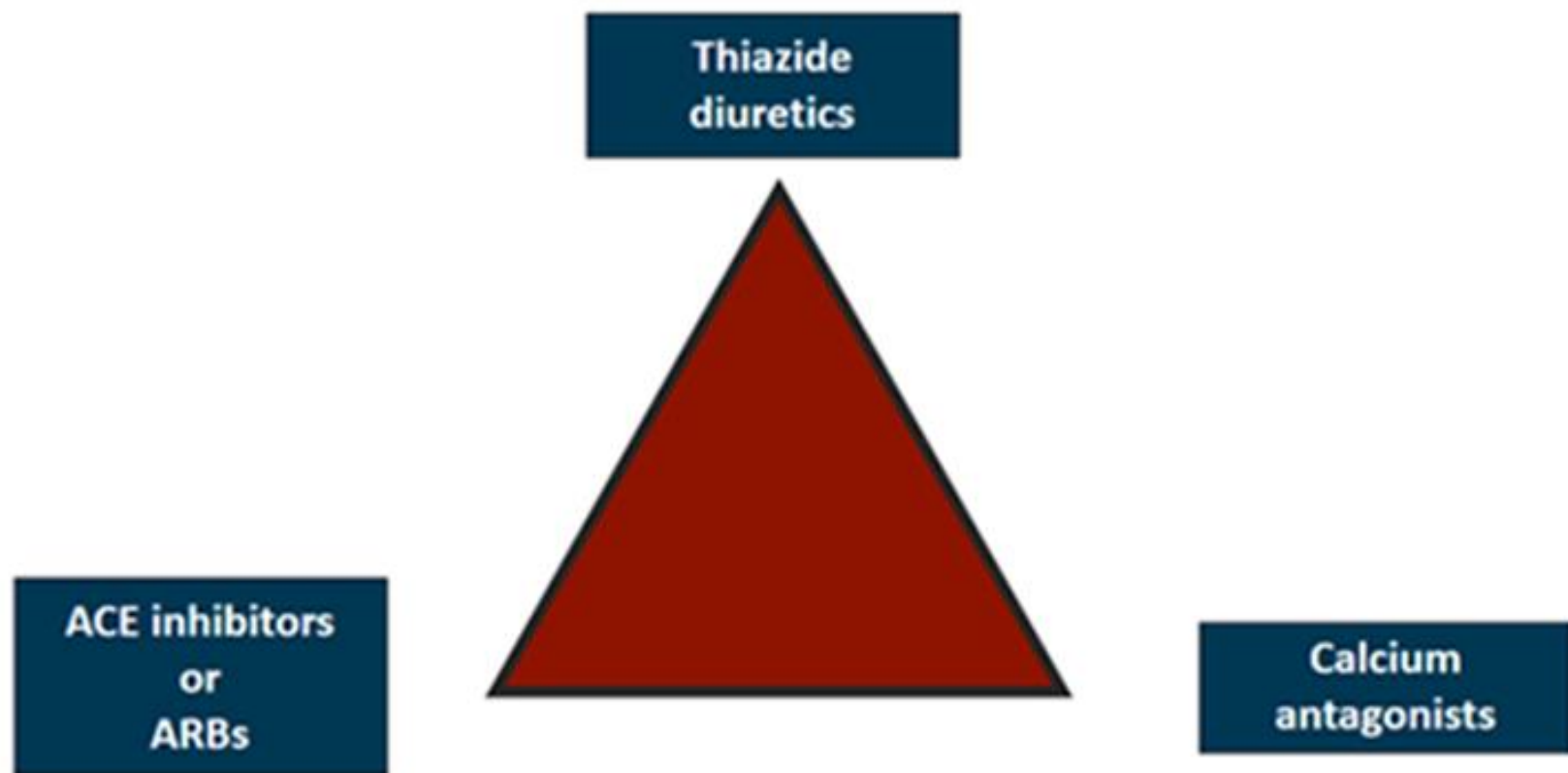
- **Brain**→ dicta:” **lower is better**” lower the BP, less is the incidence of stroke( ACCORD BP & INVEST)
- **Heart**:<sub>d</sub>BP < 70 - 80 → ↑ AMI incidence → J-shaped curved.
- **Kidney**: intraglomerular pressure(IGP) matters > BP in renal arteries: ↑ IGP → proteinuria → adversely affect kidneys + CV syst → in renal hypertension, **drugs ↓ IGP like ACEI / ARBS / Cilnidipine preferred.**

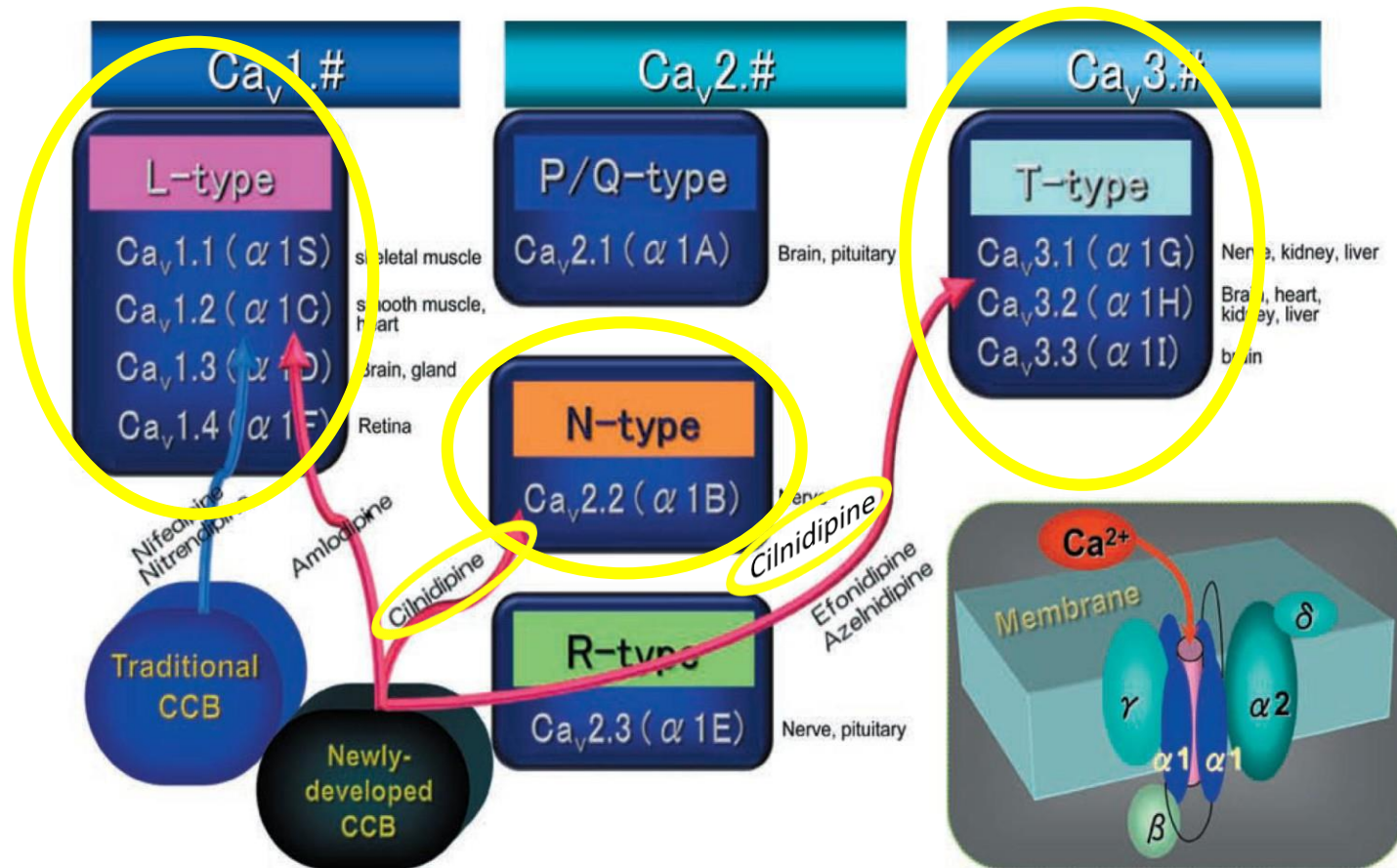


# JNC 8

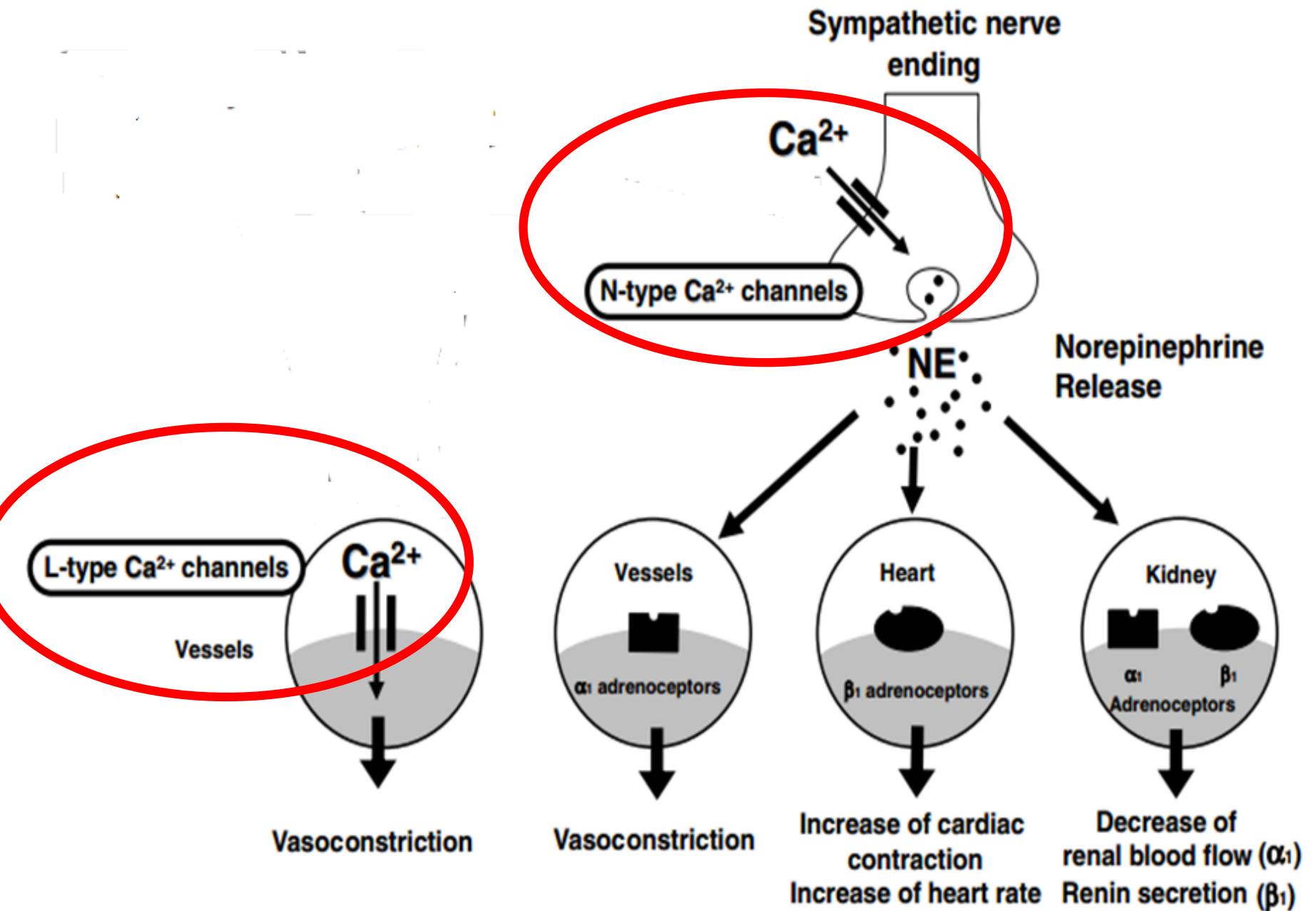
## *Initial Medications for the Management of Hypertension*

Lifestyle Modification—Especially Diet and Exercise

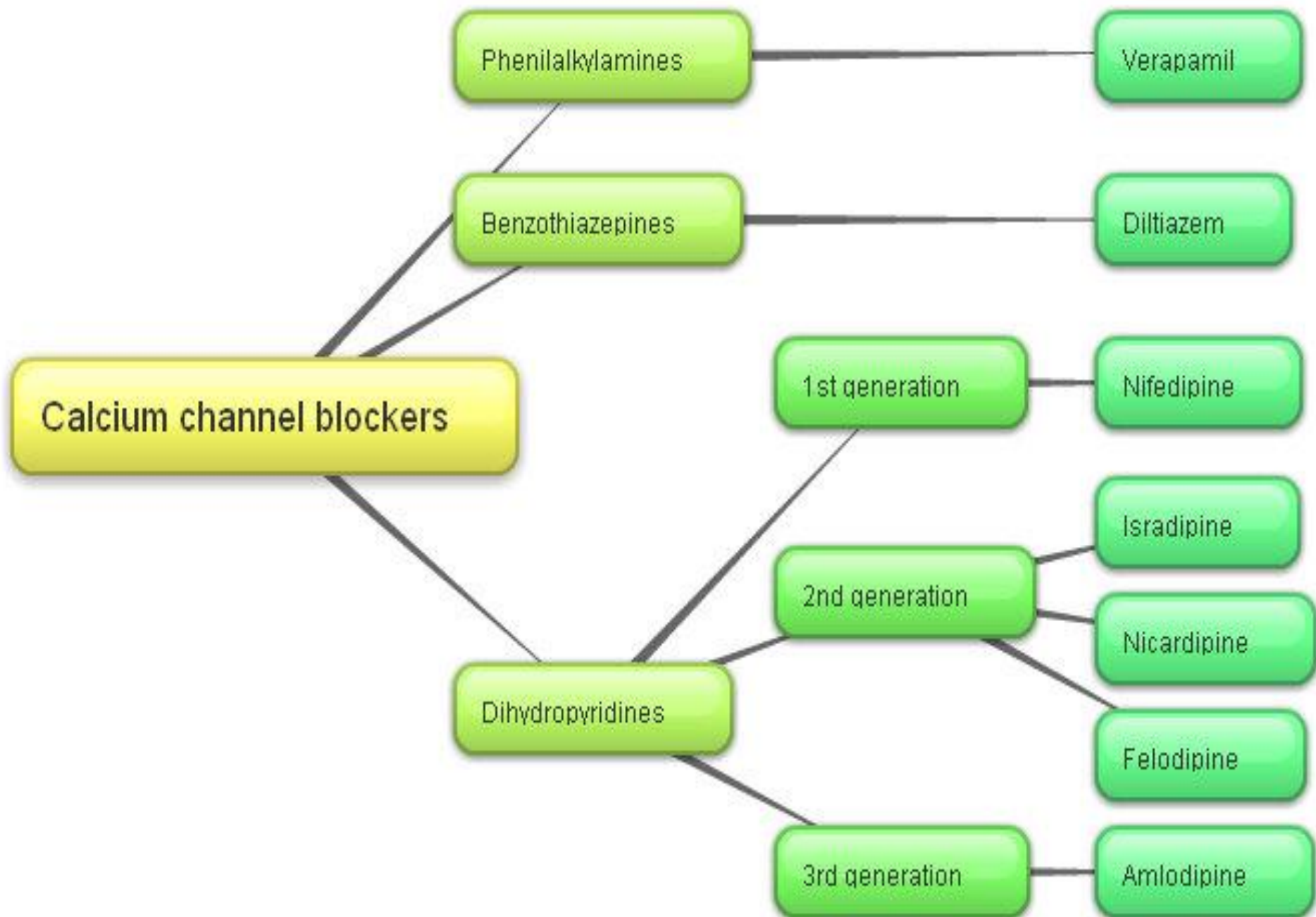


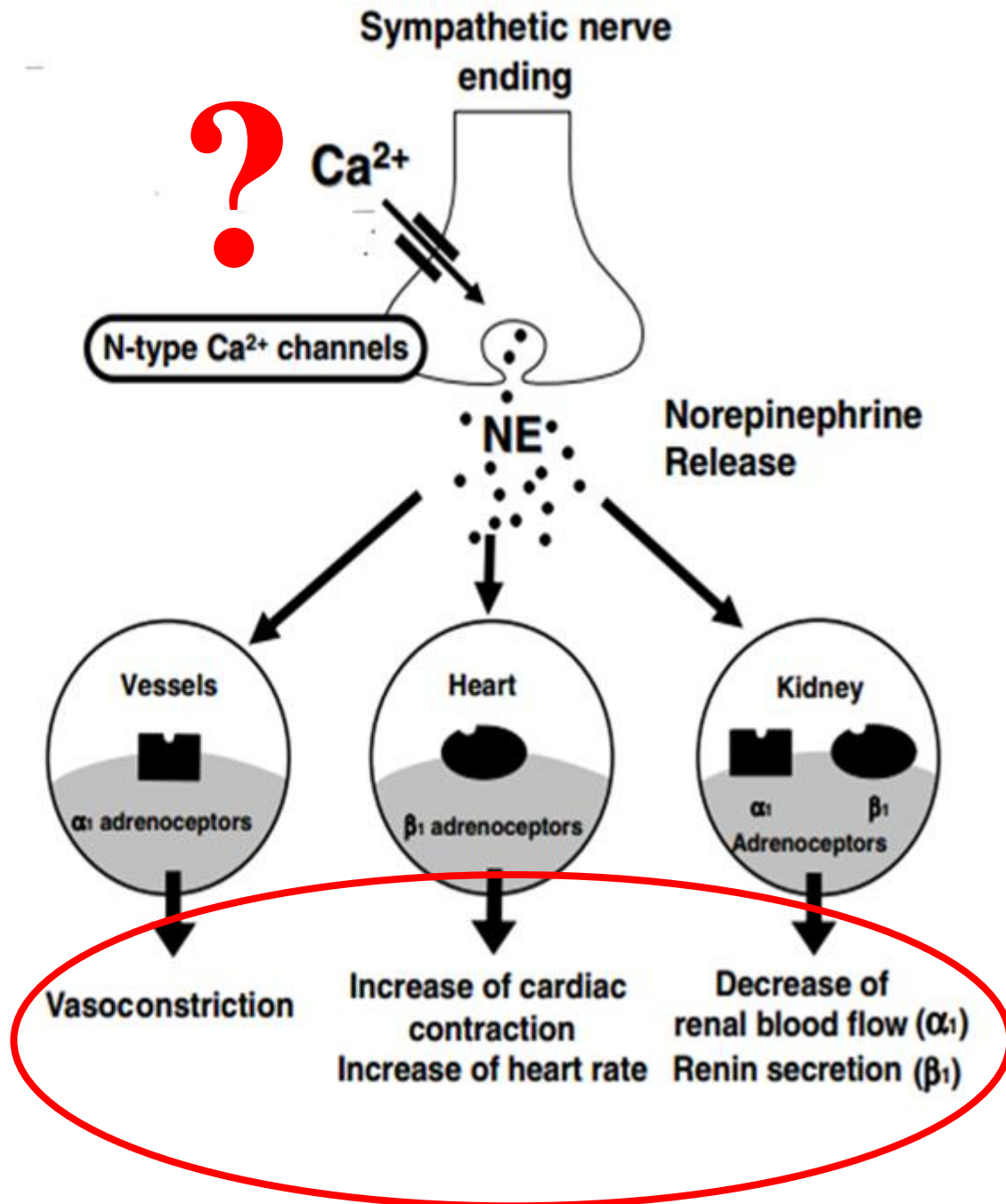
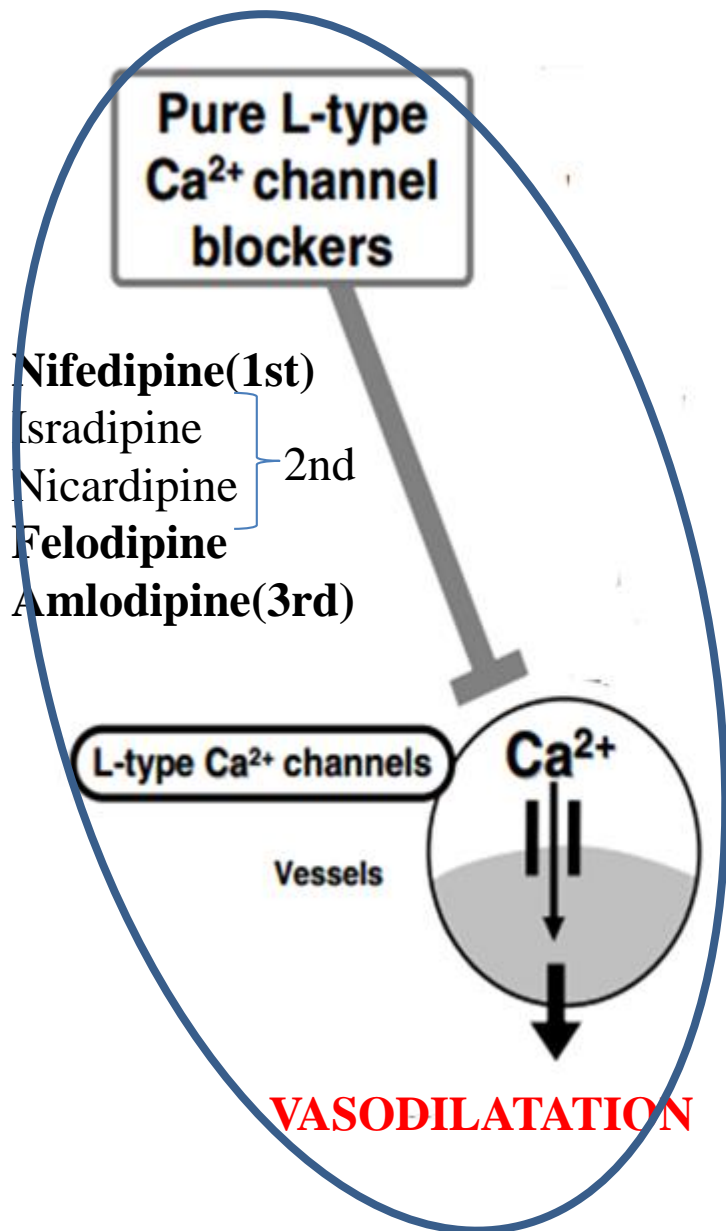


**Fig. 1** Classification of voltage-dependent Ca channels. CCB; calcium channel blocker.



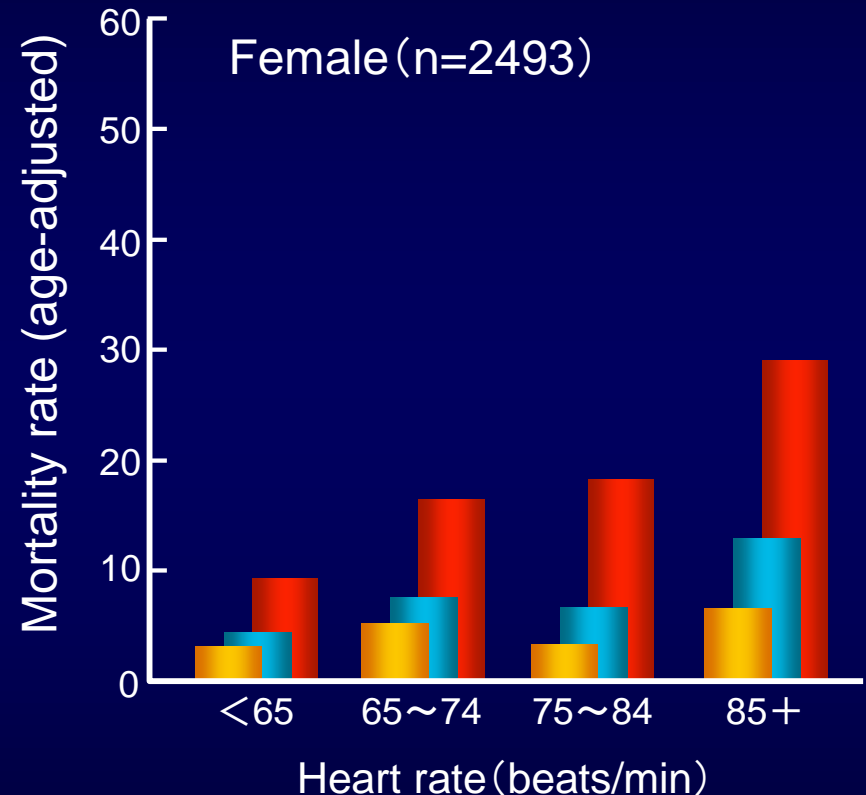
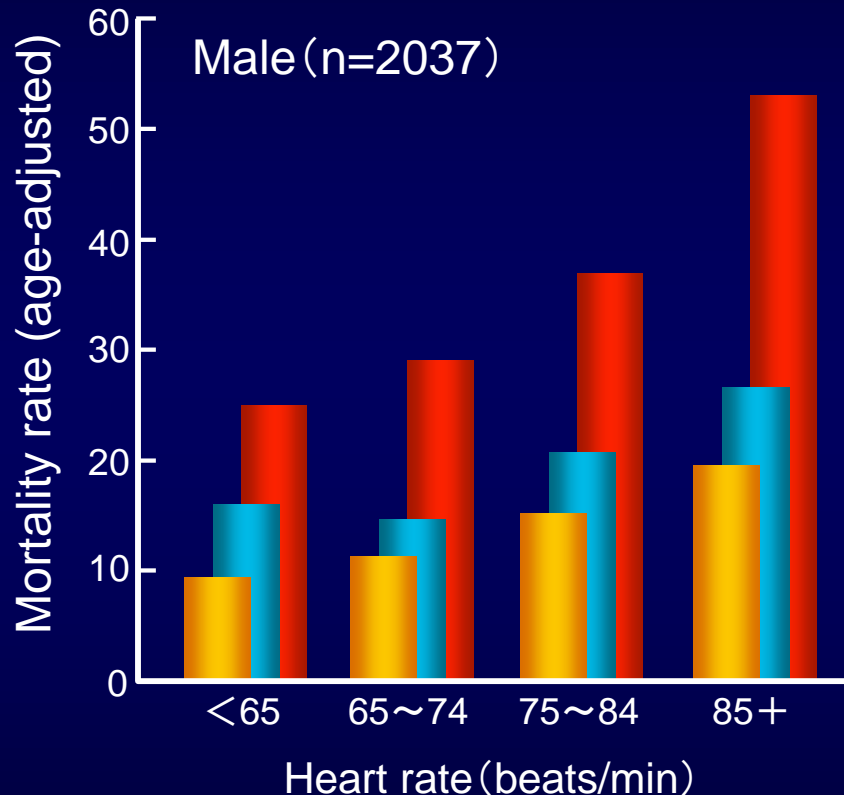






# Relationship between heart rate and mortality in patients with hypertension

(The Framingham Study): 4,530 HT pts, , no ttt, 35-74y[ ♀ 2,493; ♂ 2037]  
(,000 people/2years)



■ All-cause mortality   ■ Mortality from cardiovascular disease   ■ Mortality from coronary disease

# Impact of CCB 1,2,3 on renal microcirculation

Block L-Type

CCBs(1,2,3)

Sympathetic nerve endings

Sympathetic nerve endings

L-Type Ca Channel

$\text{Ca}^{2+}$

N-Type Ca Channel

$\text{Ca}^{2+}$

Sympathetic nerves

Dilatation

Afferent arteriole

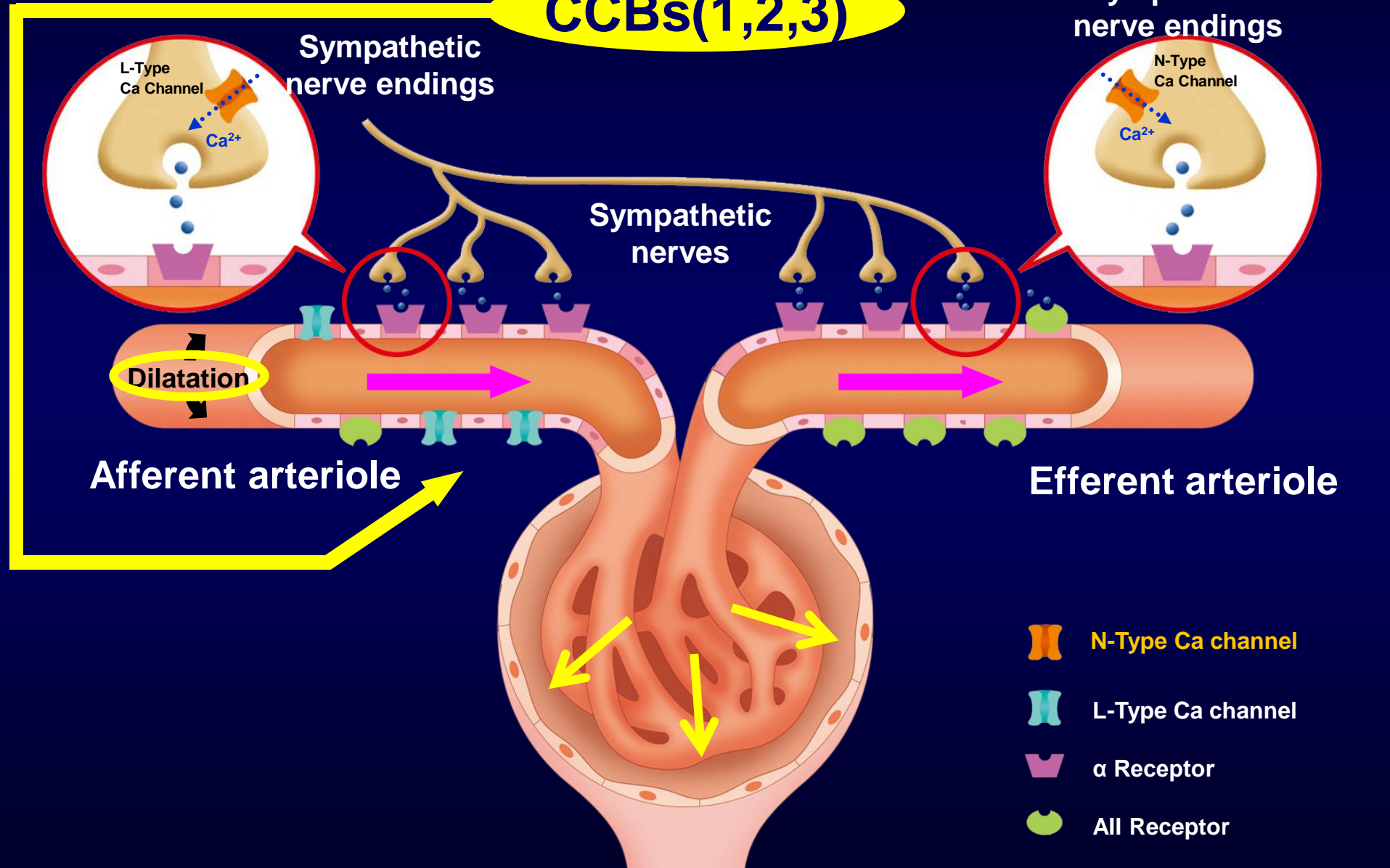
Efferent arteriole

N-Type Ca channel

L-Type Ca channel

$\alpha$  Receptor

All Receptor

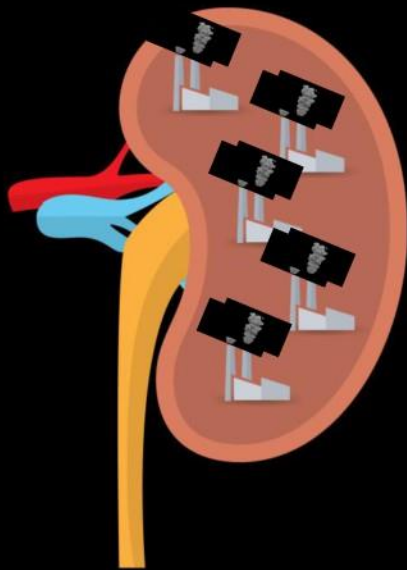


# INTRAGLOMERULAR BLOOD PRESSURE AND CKD PROGRESSION

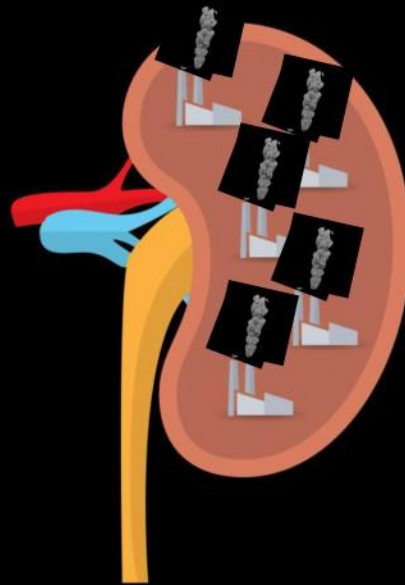
Normal

Intraglomerular  
Hypertensión

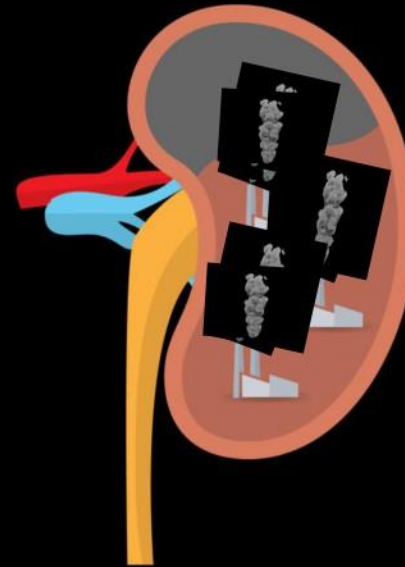
CKD STAGE III CKD STAGE IV



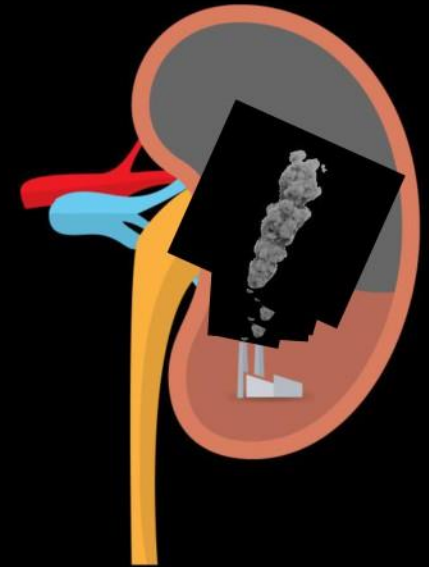
GFR >90 ml/min



GFR >135ml/min  
Hyperfiltration



GFR <60ml/min



GFR <30ml/min

# KDIGO 2013 Clinical Practice Guideline for the Management of BP in CKD

Nên tránh sử dụng dihydropyridine calcium channel blockers nơi BN BTM đã có Albumin niệu đặc biệt nếu không sử dụng đồng thời với ACE-I hoặc ARB



- Các thuốc CCBs khác nhau về tác dụng trên các tiểu động mạch cầu thận:
  - **Kênh thụ thể L** (chủ yếu trên tiểu động mạch đến). →  
→ ↑ áp lực trong cầu thận → **↑Albumin niệu**
  - **Kênh thụ thể T/N** (có cả trên tiểu động mạch đến & đi)  
→ ↓ áp lực trong cầu thận → **↓Albumin niệu**

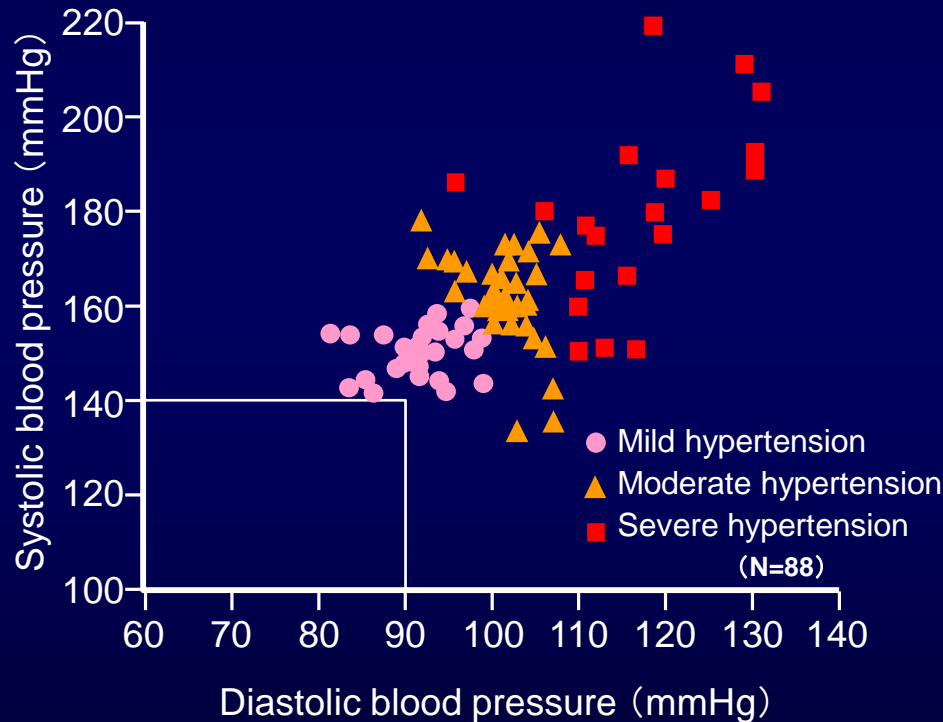
**Các thuốc CCBs thế hệ sau (cilnidipine ,  
manipine,) chọn thụ thể T/N → Không làm ↑Alb  
niệu mà còn có thể làm ↓Albumin niệu**

# CALCIUM ANTAGONIST EVOLUTION

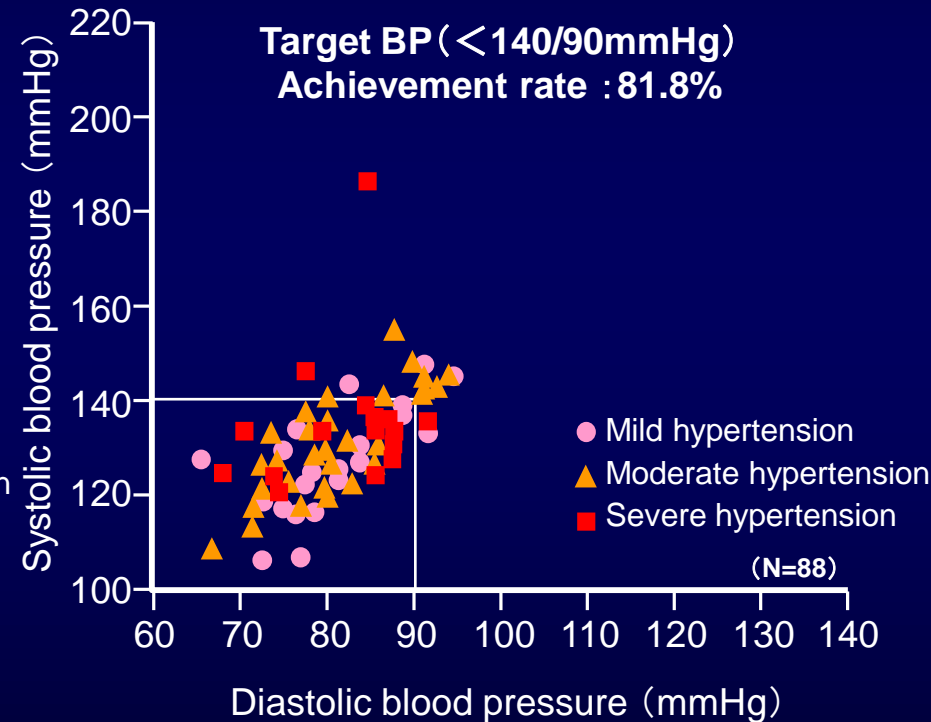
## **4th-generation CCB: Cilnidipine**

# Blood pressure control by long-term cilnidipine therapy

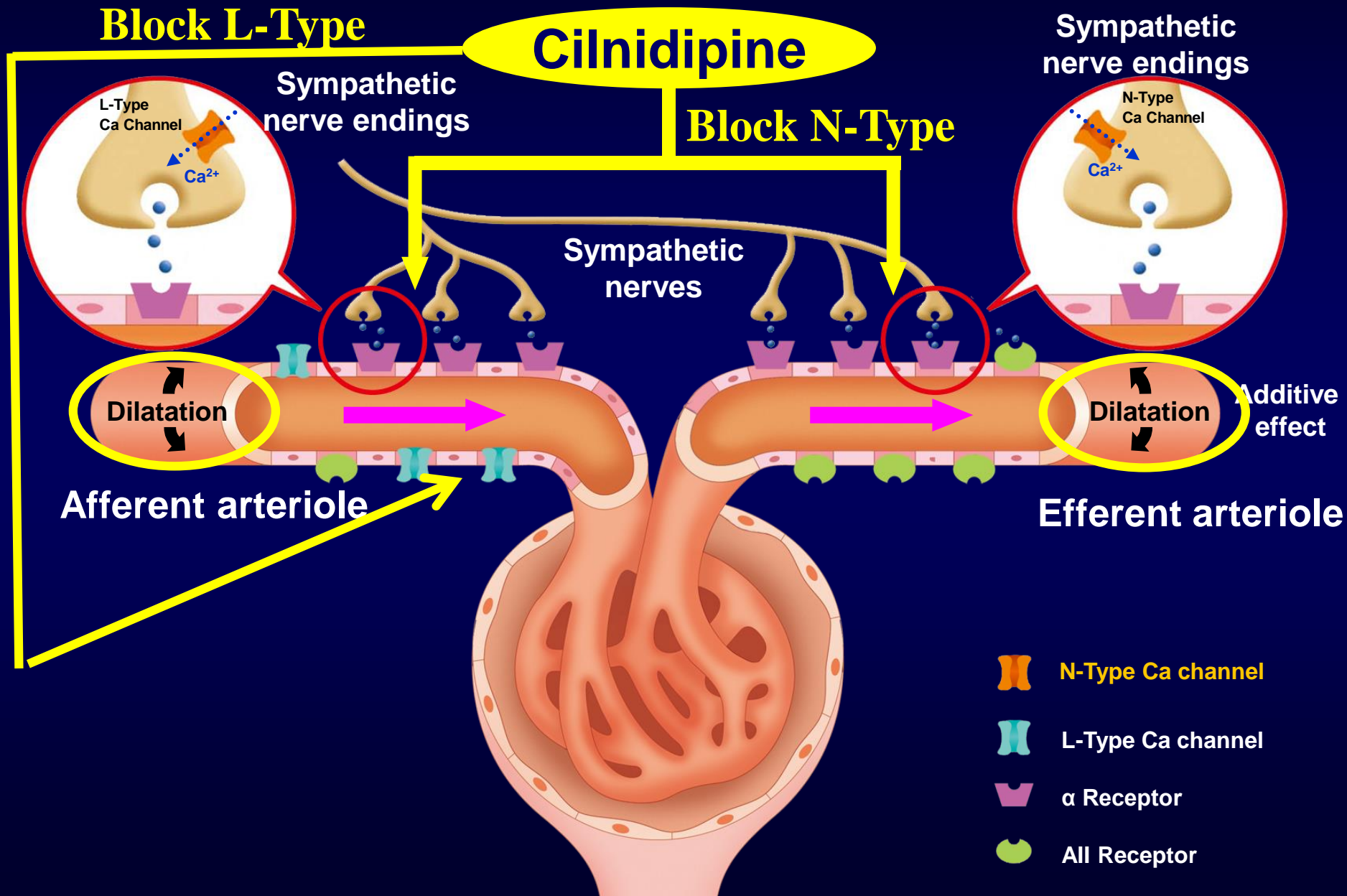
Before administration



30-36 months after administration



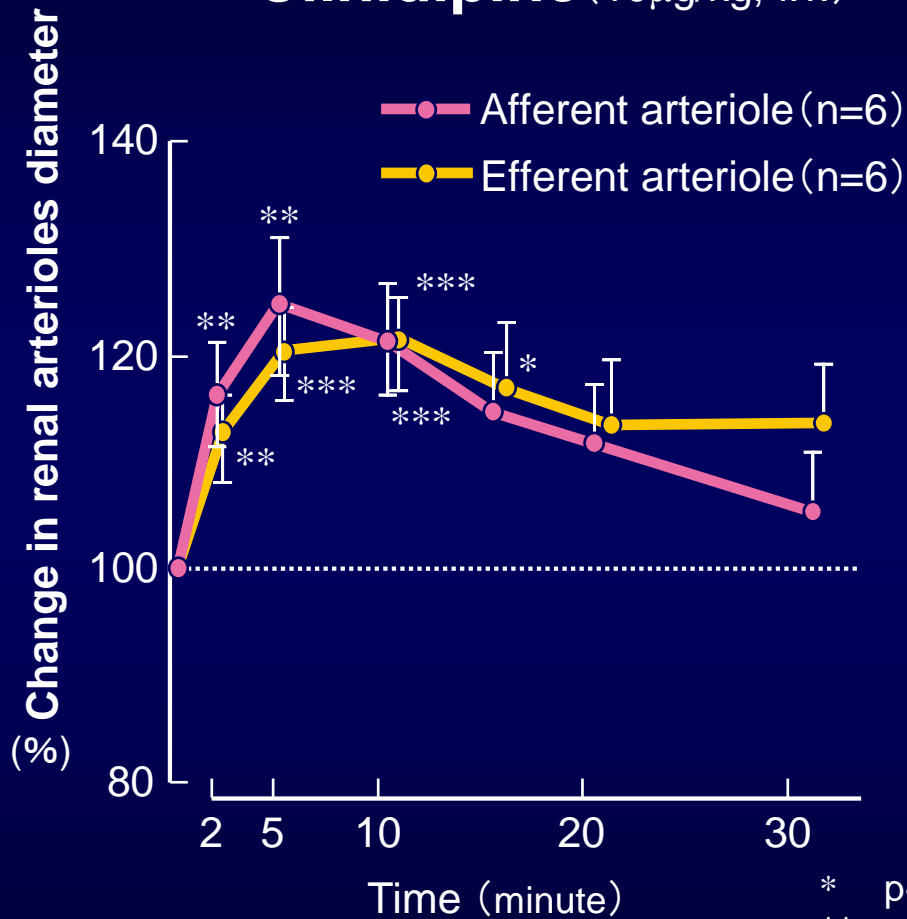
# Impact of CCB 4 on renal microcirculation



# Renal vasodilator effect of Cilnidipine

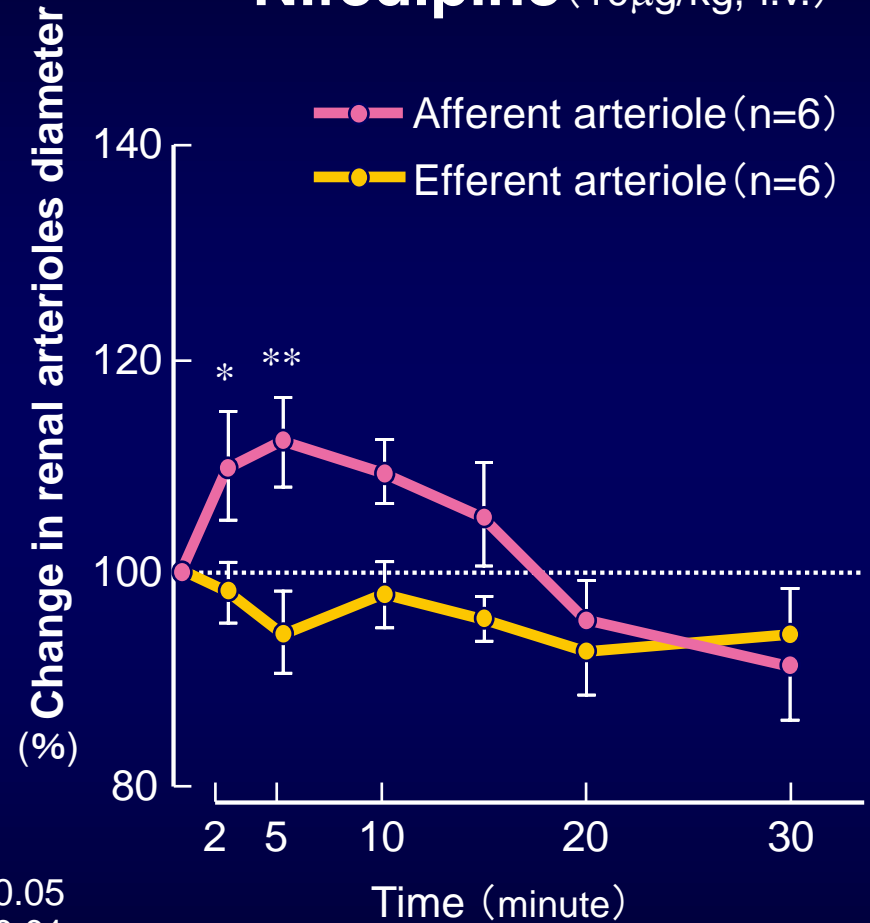
## ~Effect to afferent and efferent arterioles~

### Cilnidipine (10 $\mu$ g/kg, i.v.)

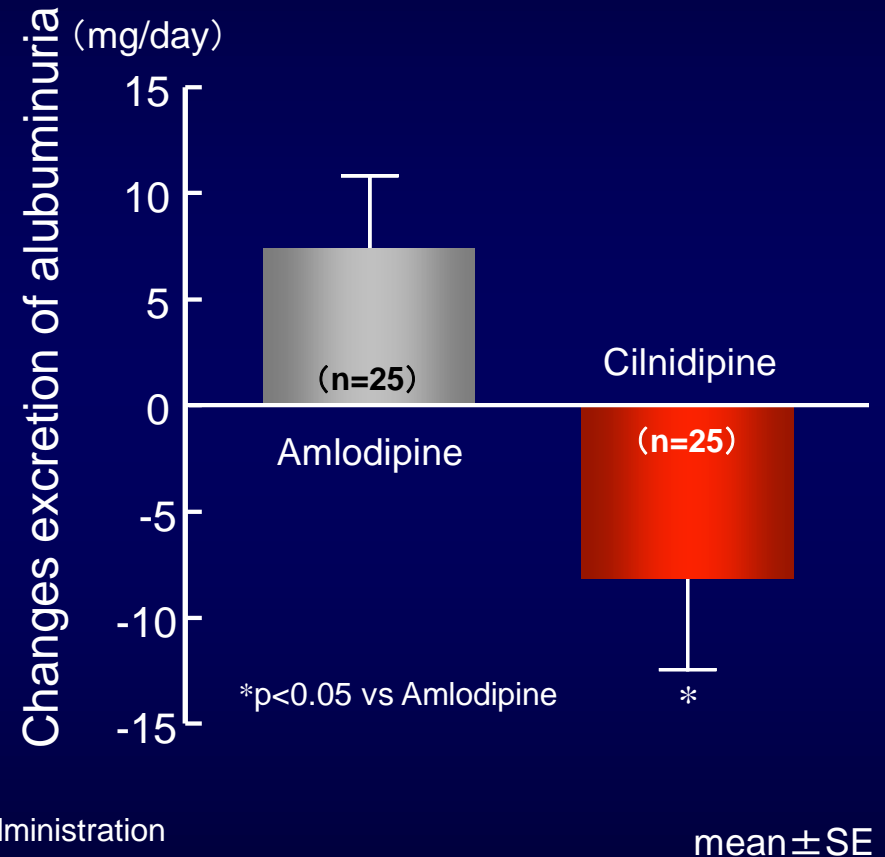
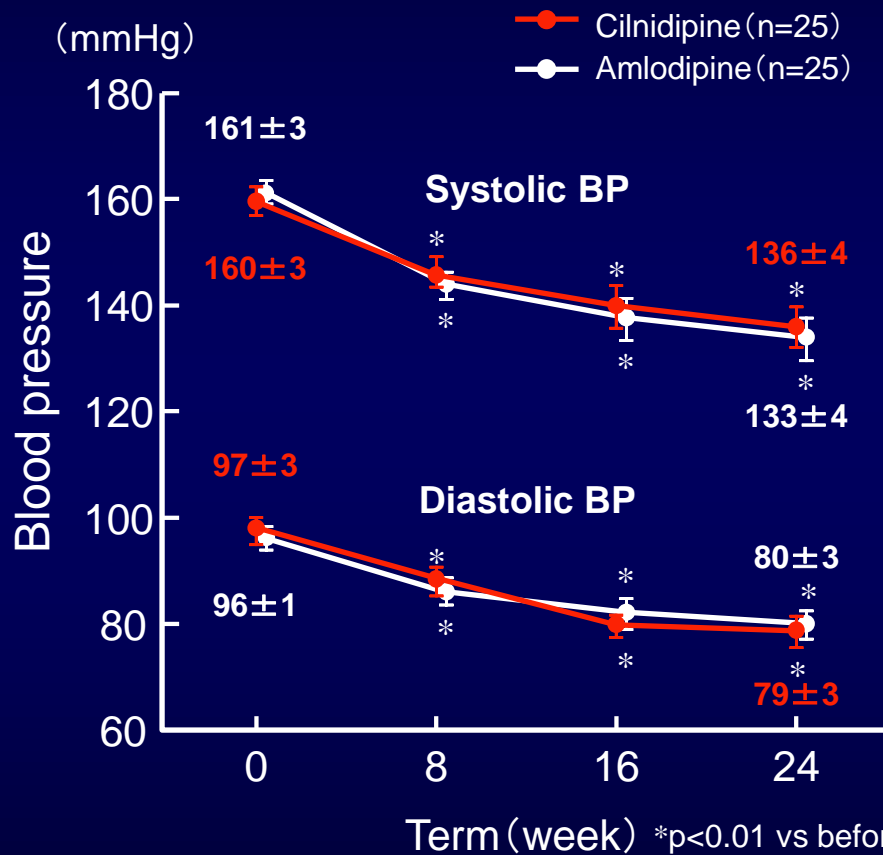


\* p<0.05  
\*\* p<0.01  
\*\*\* p<0.001  
(vs Control)

### Nifedipine (10 $\mu$ g/kg, i.v.)



# Effect of Cilnidipine on urinary albumin excretion in patients with hypertension

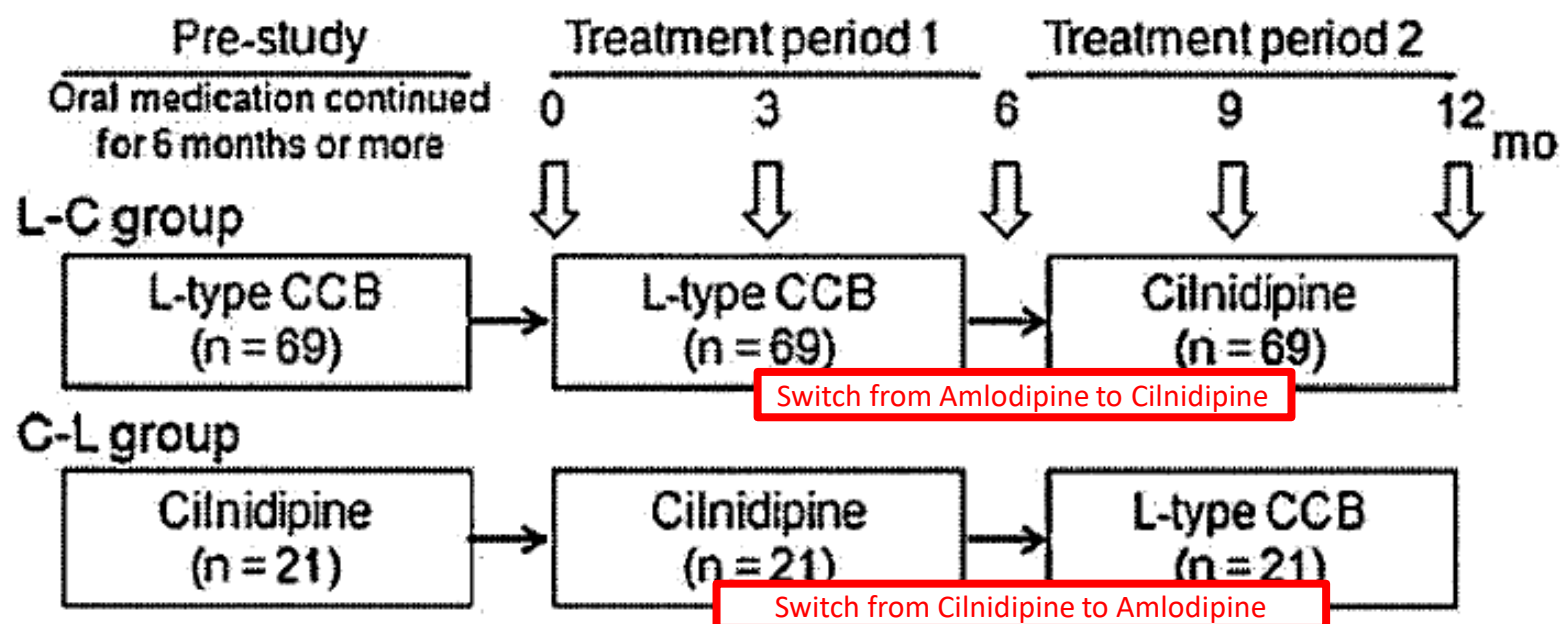




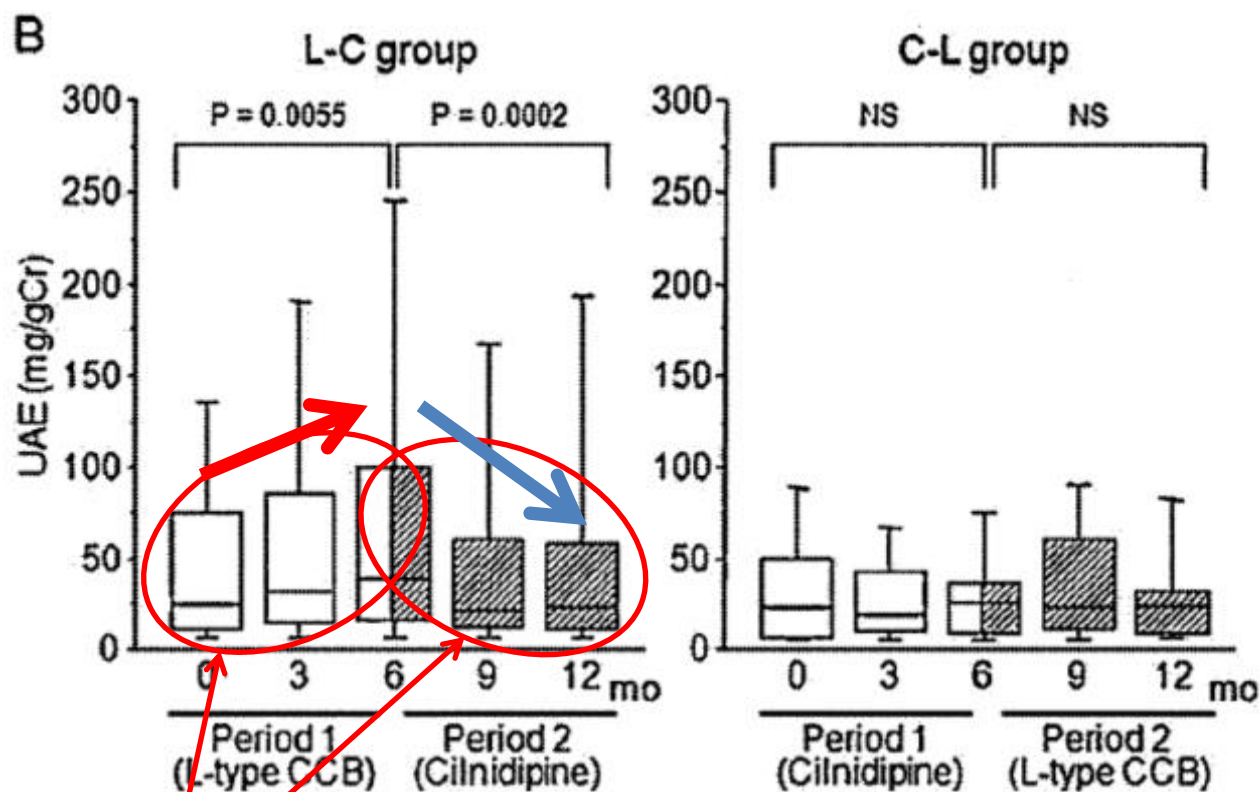
## Antialbuminuric advantage of cilnidipine compared with L-type calcium channel blockers in type 2 diabetic patients with normoalbuminuria and microalbuminuria

Shinya Fukumoto<sup>a</sup>, Eiji Ishimura<sup>b,\*</sup>, Koka Motoyama<sup>a</sup>, Tomoaki Morioka<sup>a</sup>, Eiji Kimoto<sup>c</sup>, Ken Wakikawa<sup>d</sup>, Shigeichi Shoji<sup>e</sup>, Hidenori Koyama<sup>a</sup>, Tetsuo Shoji<sup>a</sup>, Masanori Emoto<sup>a</sup>, Yoshiki Nishizawa<sup>a</sup>, Masaaki Inaba<sup>a</sup>

on behalf of the Cilnidipine vs L-type calcium channel blockers Evaluation of Antihypertensive Renoprotective Effects in Diabetic patients (CLEARED) Study Investigators



## Antialbuminuric advantage of cilnidipine compared with L-type calcium channel blockers in type 2 diabetic patients with normoalbuminuria and microalbuminuria



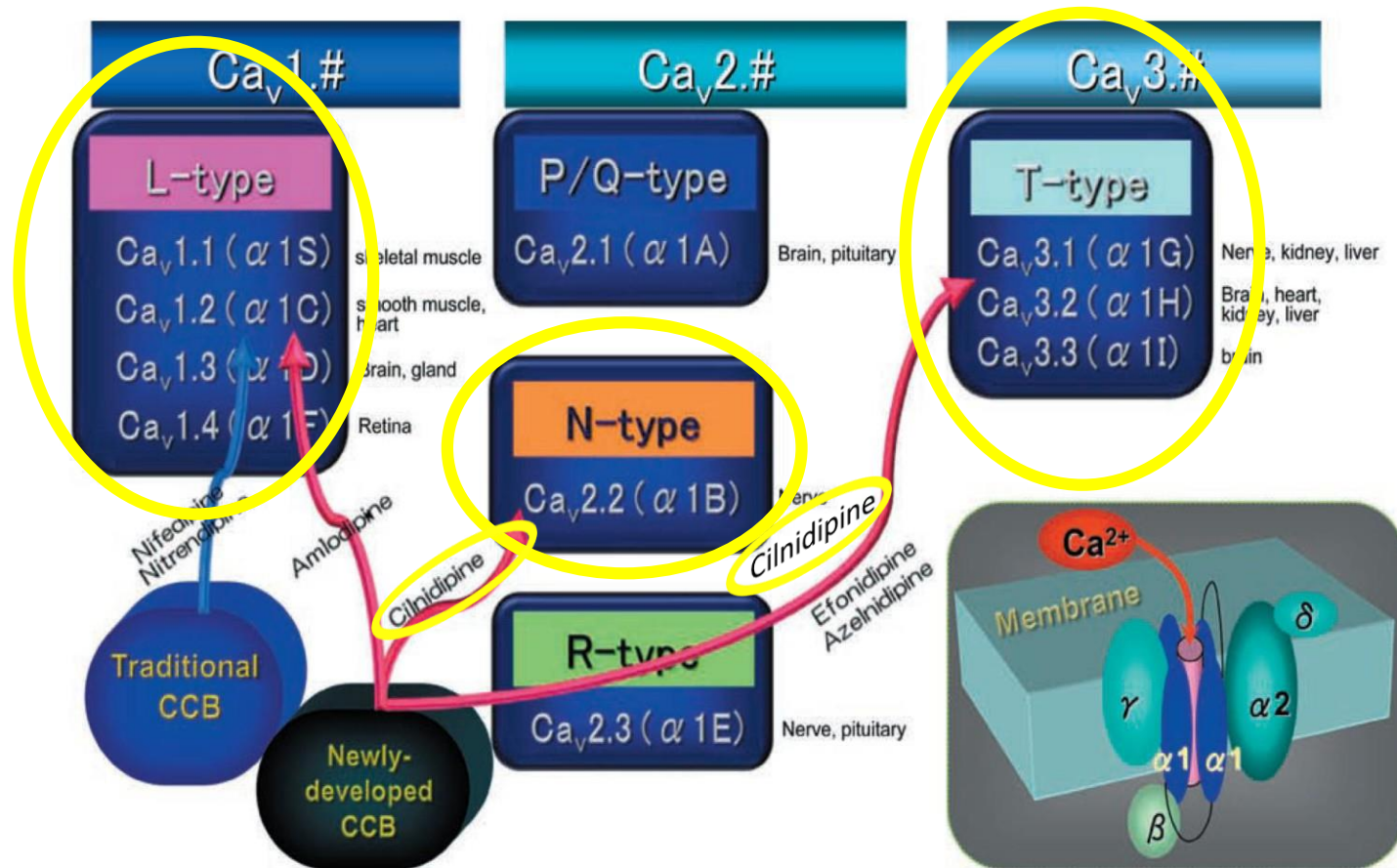
↓ Urea Albumin Excretion in Switching from Amlodipine to Cilnidipine group is significantly greater than that of switching from Cilnidipine to Amlodipine

## New update Clinical trial on Cilnidipine and L- type CCB ( UACR)

### Evidence with “novel” DHP-CCB: Cilnidipine vs L-type CCB

11

Study	Population	Duration	Intervention	Outcome
<b>CLEARED</b> Fukumoto S, et al. 2011.	T2DM UACR <300mg/g	Crossover 6 months each	Cilnidipine vs L-type CCB	Decreased UACR with cilnidipine Prolonged effect of cilnidipine on UACR
Masuda T, et al. 2011	HTN T2DM group	Crossover 8-9 months each	Cilnidipine vs Amlodipine	UACR lower with cilnidipine use
<b>SAKURA</b> Ando K, et al. 2012.	T2DM UACR 30- 300mg/d RAS inhibition	12 months	Cilnidipine vs amlodipine	UACR decreased more with cilnidipine initially (3 to 6 months) No significant difference seen after 12 months



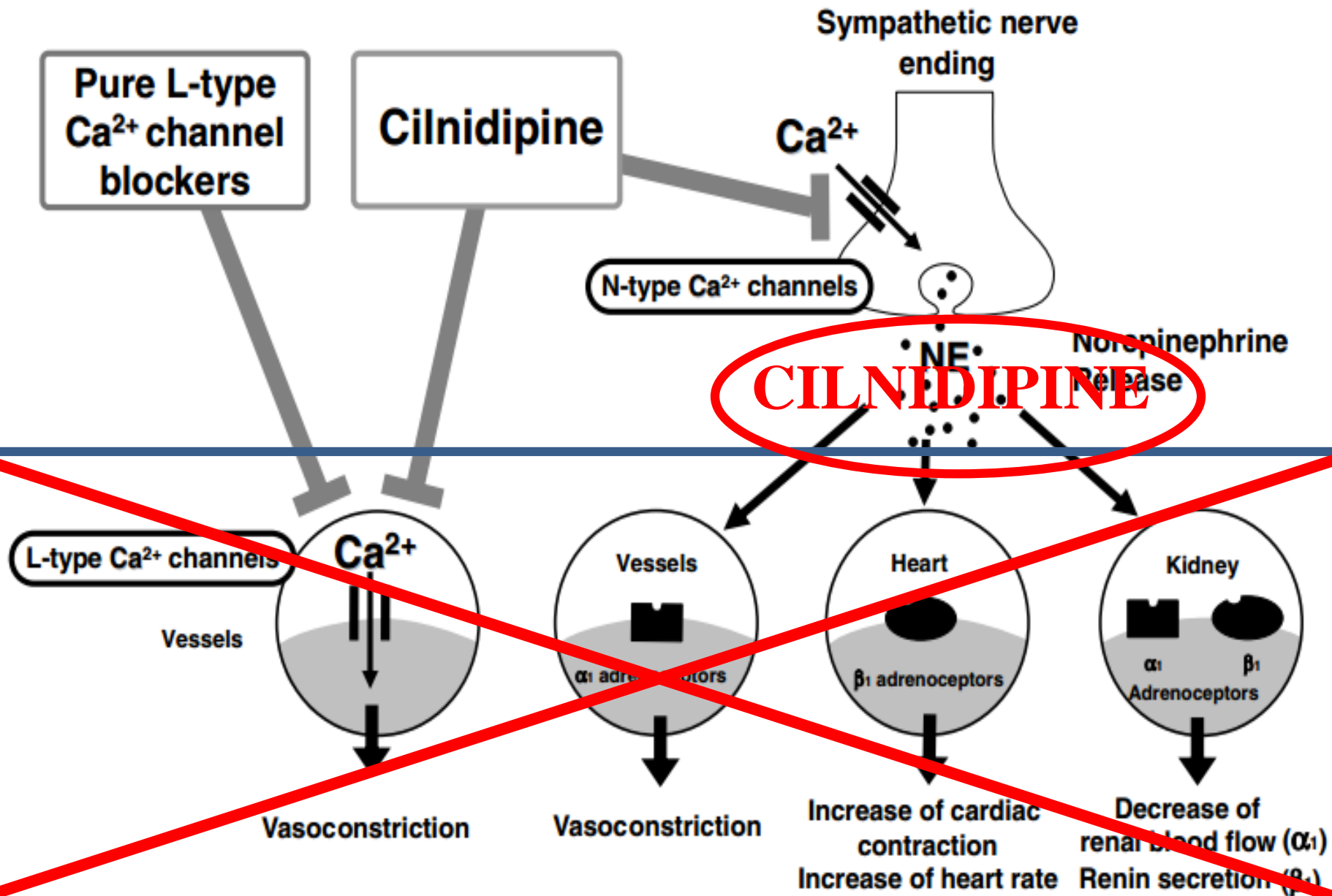
**Fig. 1** Classification of voltage-dependent Ca channels.  
CCB; calcium channel blocker.

# CCBs classification

## based on actions on $\Sigma$ nerves

Generation from the view of effect on sympathetic nerve system	Sympathetic nerve activity	Generic name	Effect on NE release (vascular)	Plasma NE concentration (SHR)
I	↑↑	Verapamil		
		Diltiazem		
		Nifedipine	No effect	Increase (+++)
		Nicardipine	No effect	Increase (+++)
II	↑	Nilvadipine		
		Manidipine		Increase (++)
		Nitrendipine		
		Nisoldipine		
		Benidipine		Increase (++)
		Barnidipine		
		Efonidipine		
		Felodipine		
		Aranidipine		
III	↗	Amlodipine	No effect	Increase(+)
		Azelnidipine		
IV	↘	Cilnidipine	Suppress	No change

↗ : Active ↘ : Suppress NE : Norepinephrine SHR : Spontaneously Hypertensive Rat



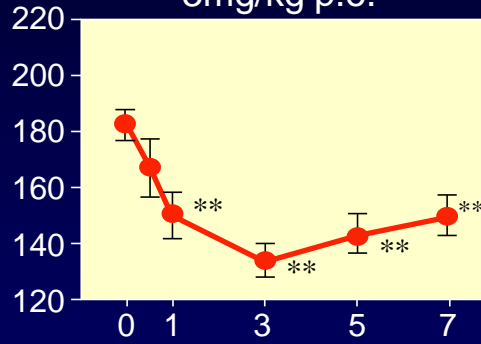
**Figure 8** Diagrammatic representation of L/N-dual action of cilnidipine.



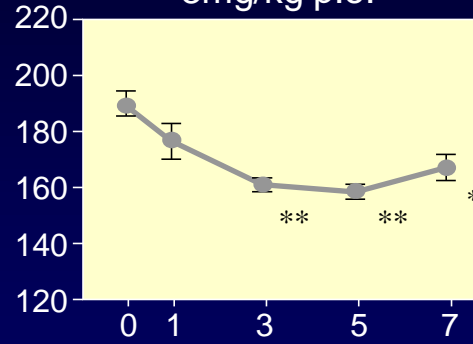
# Changes in heart rate and plasma norepinephrine (SHR)

Systolic BP  
(mmHg)  
(n=11)

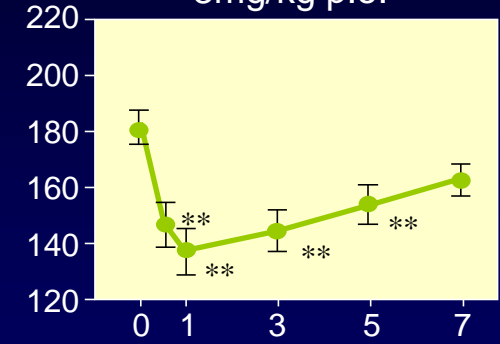
Cilnidipine  
3mg/kg p.o.



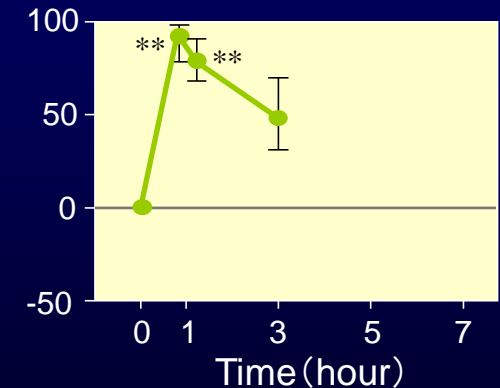
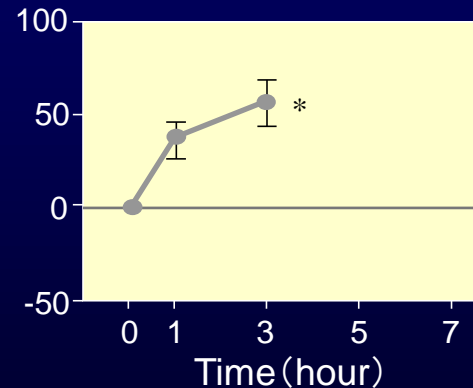
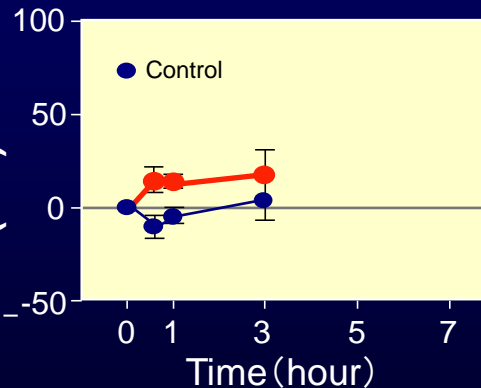
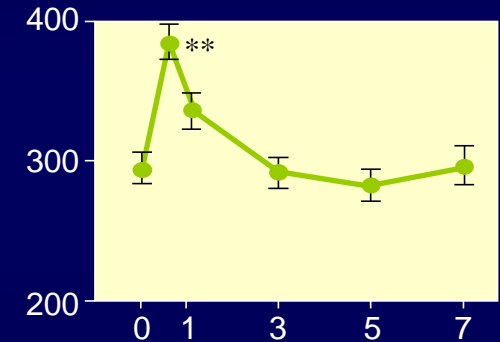
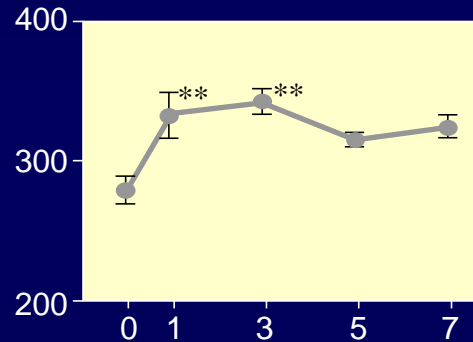
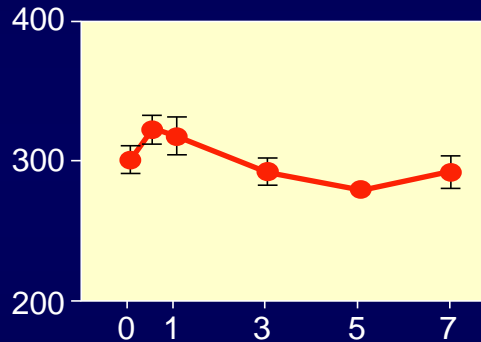
Amlodipine  
3mg/kg p.o.



Nifedipine  
3mg/kg p.o.



Plasma Norepinephrine Heart Rate  
(beats/min)  
(n=11)



\* p<0.05 (vs before administration)  
\*\* p<0.01

mean ± SE

## Scholars Bulletin

(A Multidisciplinary Journal)

An Official Publication of "Scholars Middle East Publishers",

Dubai, United Arab Emirates

Website: <http://scholarsbulletin.com/>

---

ISSN 2412-9771 (Print)

ISSN 2412-897X (Online)

### Role of Cilnidipine in the Management of Essential Hypertension

U. S. P. Keshri<sup>1\*</sup>, Ritesh Kumar<sup>2</sup>, Arijit Das<sup>3</sup>

<sup>1</sup>Associate Professor (MD), Department of Pharmacology<sup>1</sup>, Rajendra Institute of Medical Sciences (RIMS), Ranchi

<sup>2</sup>Associate Professor (DM), Department of Cardiology<sup>2</sup>, Rajendra Institute of Medical Sciences (RIMS), Ranchi

<sup>3</sup>Junior Resident (MBBS), Department of Pharmacology<sup>1</sup>, Rajendra Institute of Medical Sciences (RIMS), Ranchi

#### \*Corresponding Author:

Keshri USP

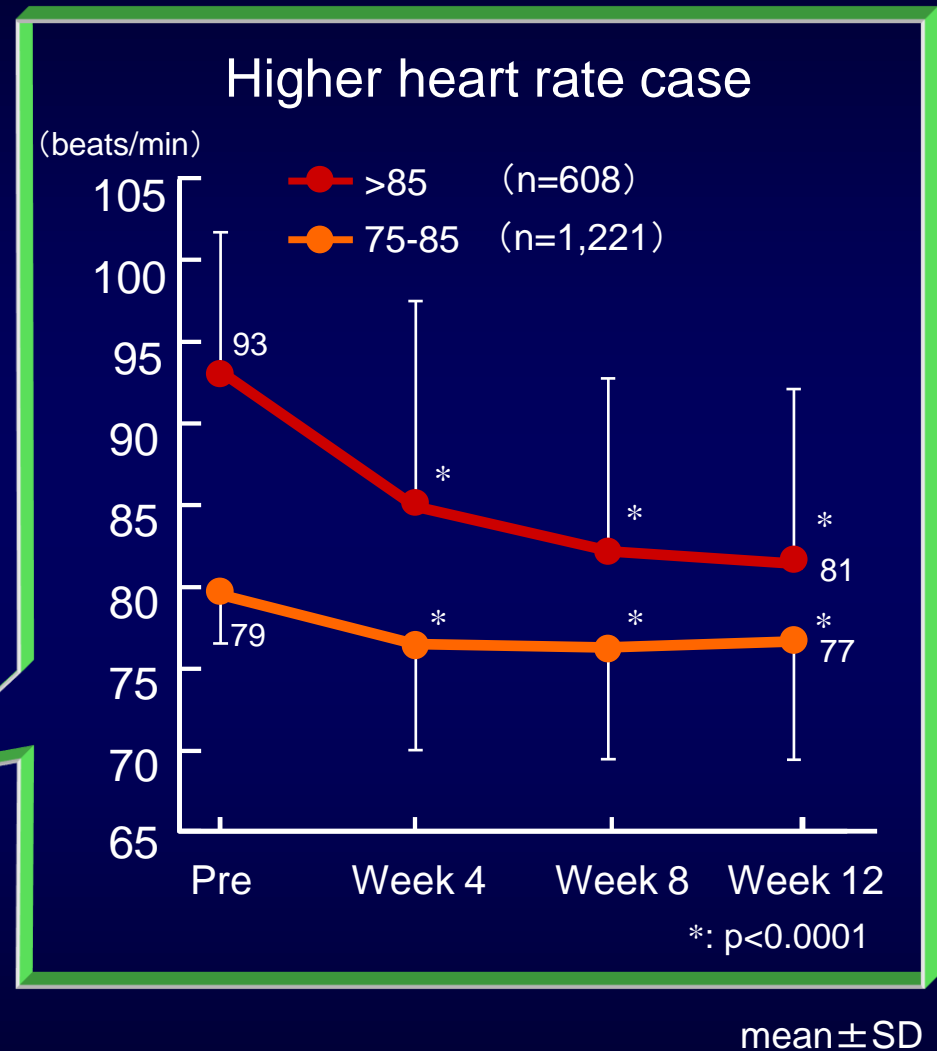
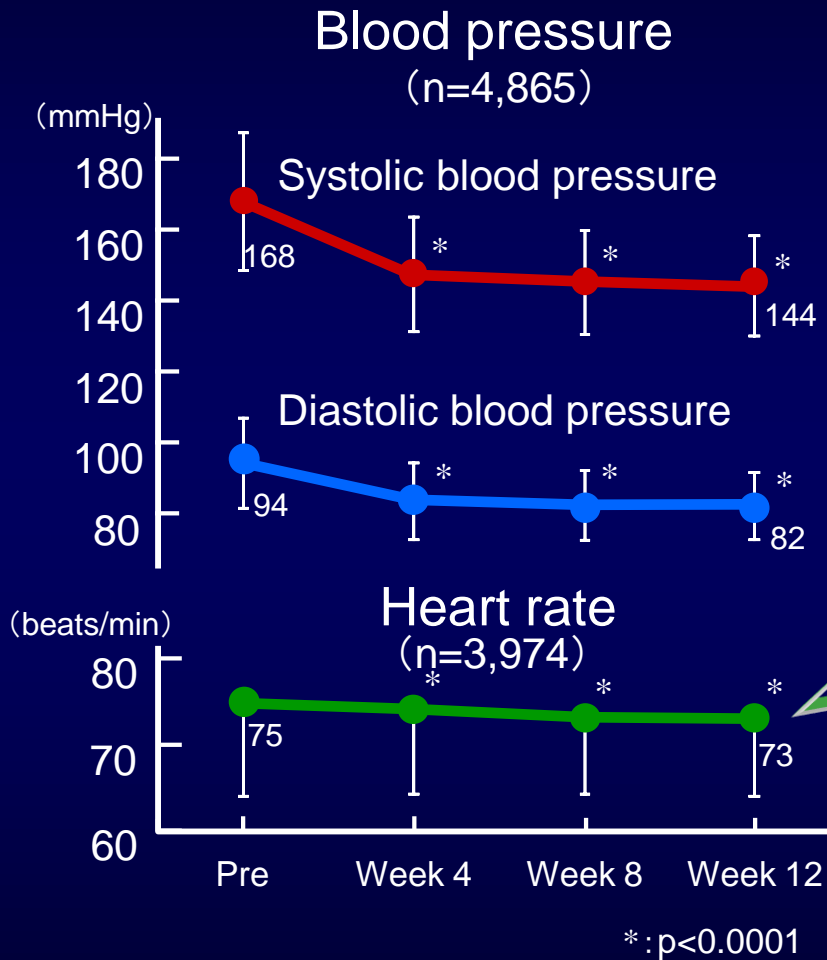
Email: [ruma\\_shanke@rediffmail.com](mailto:ruma_shanke@rediffmail.com)

---

**Abstract:** Large numbers of drugs are used in the treatment of hypertension and Calcium Channel Blockers are an important group among them. Cilnidipine is a new calcium channel blocking drug distinguished from other L-type calcium channel blockers with additional N-type of calcium channel blocking property. Cardioprotective, renoprotective and neuroprotective action of cilnidipine can provide additional benefit in form of reduced morbidity in the management of hypertension by controlling sympathetic over activity.

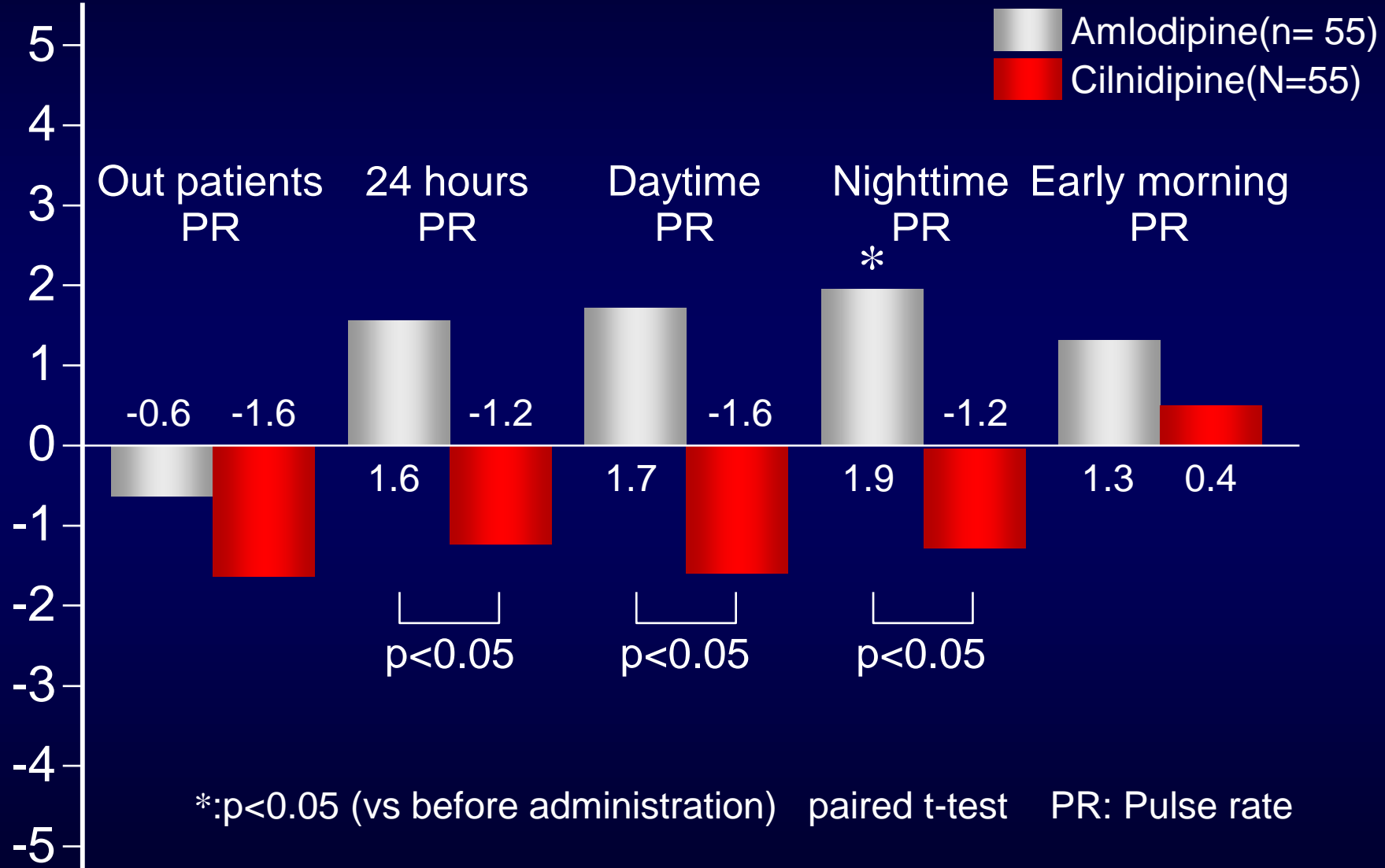
**Keywords:** Hypertension, L-type calcium channel blockers, N-type Calcium Channel Blocking property, sympathetic

# Effect of Cilnidipine on Heart rate



# Effect of Cilnidipine on heart rate

(beats/minutes)

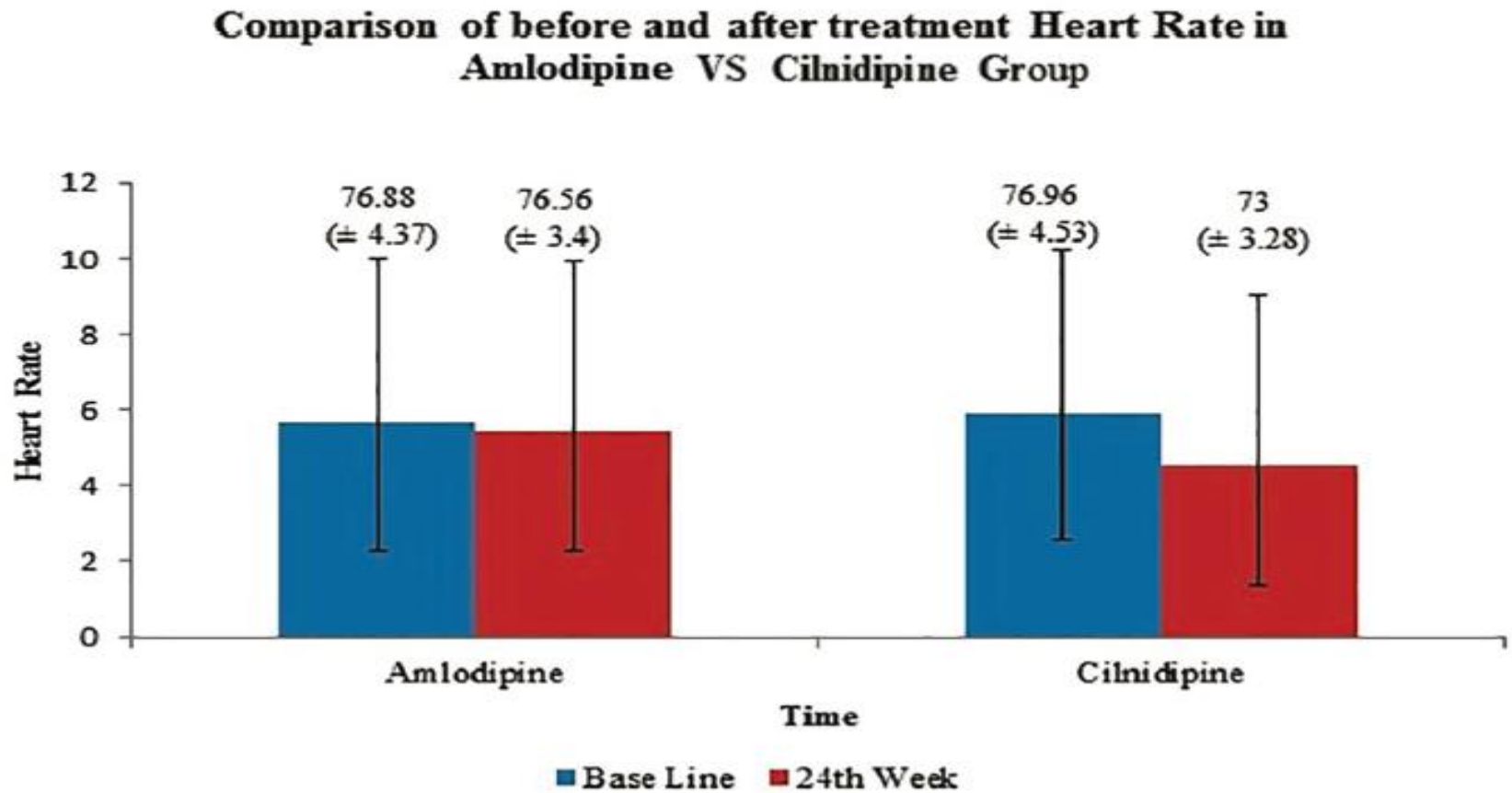


## Effects of Cilnidipine on Heart Rate and Uric Acid Metabolism in Patients With Essential Hypertension

**Table 1.** General Characteristics of Patients of Amlodipine and Cilnidipine Groups

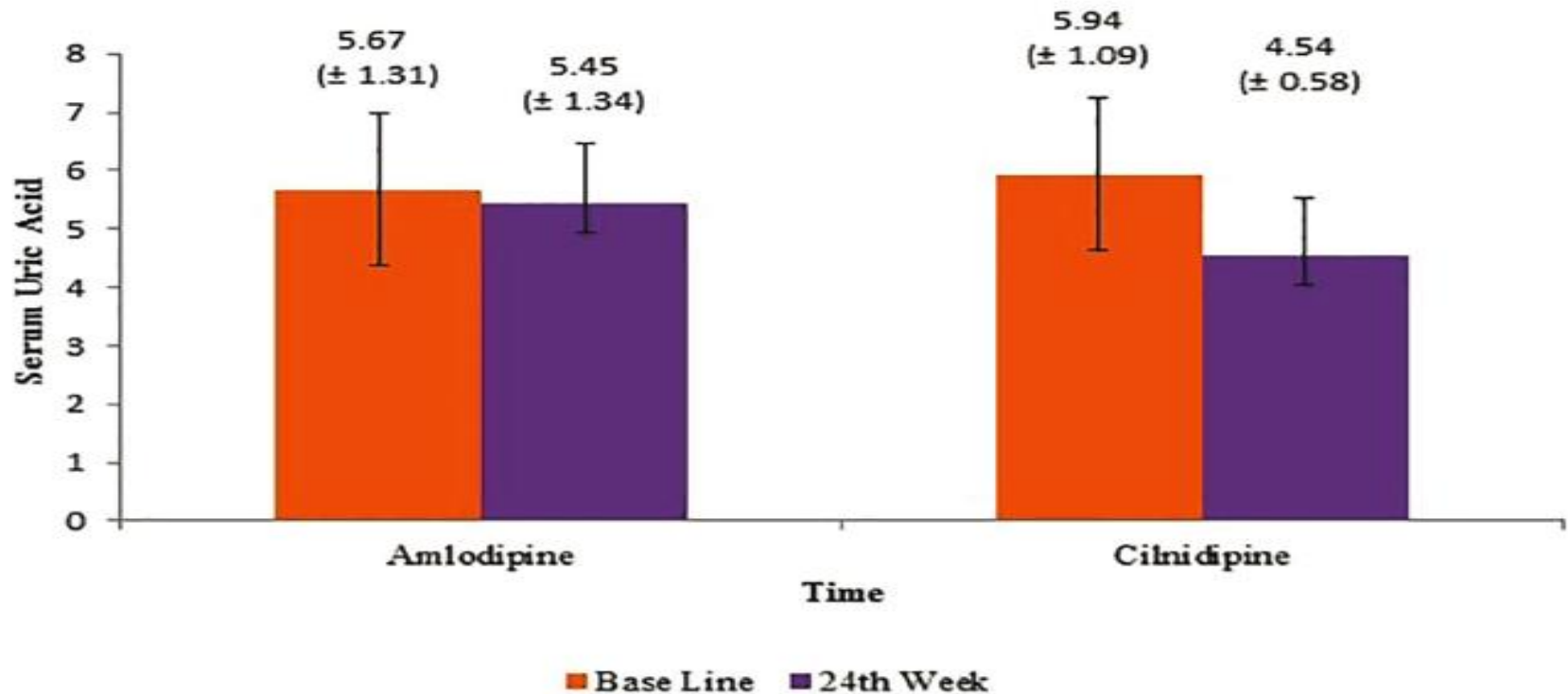
Parameters	Amlodipine	Cilnidipine
N	47	45
Male	25	23
Female	22	22
Age (years)	52.86 ± 5.81	53.14 ± 5.24
Body weight (kg)	67.56 ± 10.85	67.94 ± 9.59
Height (cm)	162.22 ± 6.79	162.78 ± 7.19
BMI	25.01 ± 5.1	25.51 ± 2.9

# Effects of Cilnidipine on Heart Rate and Uric Acid Metabolism in Patients With Essential Hypertension



# Effects of Cilnidipine on Heart Rate and Uric Acid Metabolism in Patients With Essential Hypertension

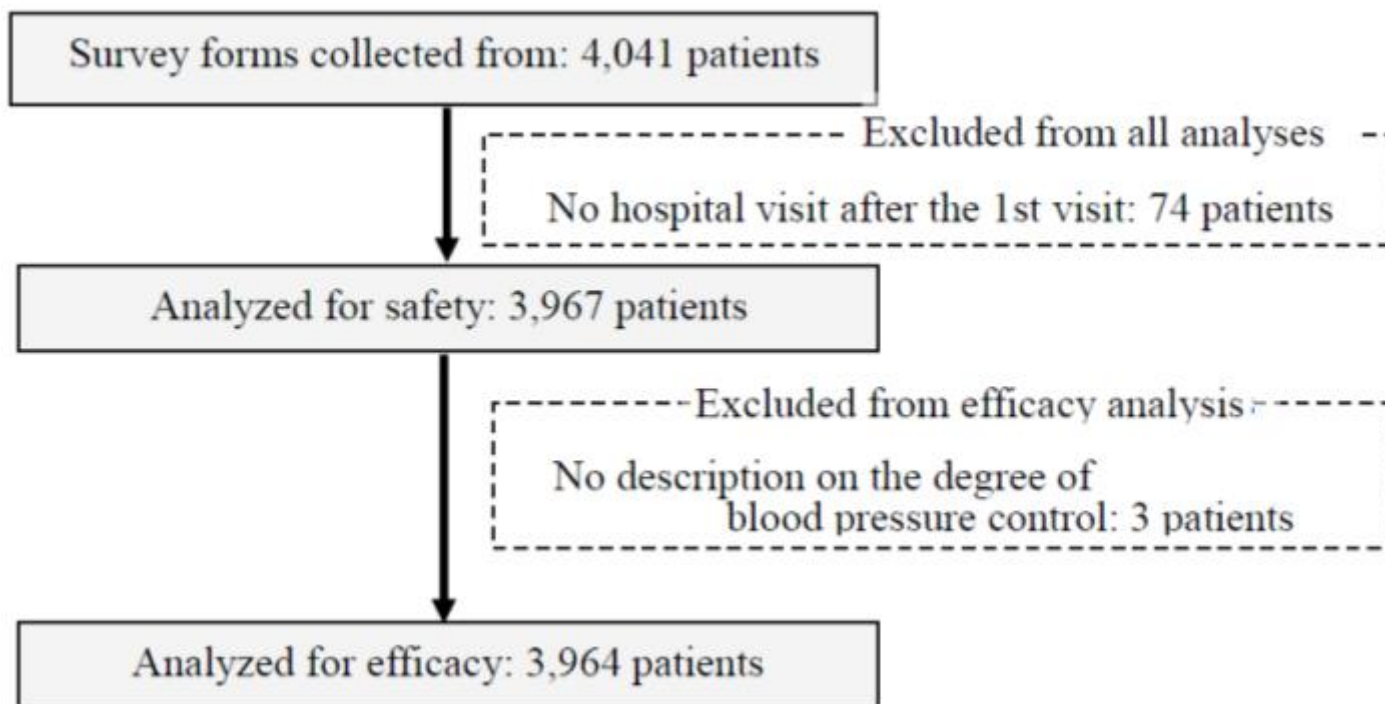
**Comparison of before and after treatment serum Uric Acid in Amlodipine VS Cilnidipine Group**





Special drug use-results survey of cilnidipine  
(type L and type N calcium channel antagonist: Atelec<sup>®</sup> Tablets and Cinalong<sup>®</sup>  
Tablets) in hypertensive patients with diabetes

Number of patients: 4,041



3,964 patients were evaluated in this study who were complicated  
with hypertension and diabetes

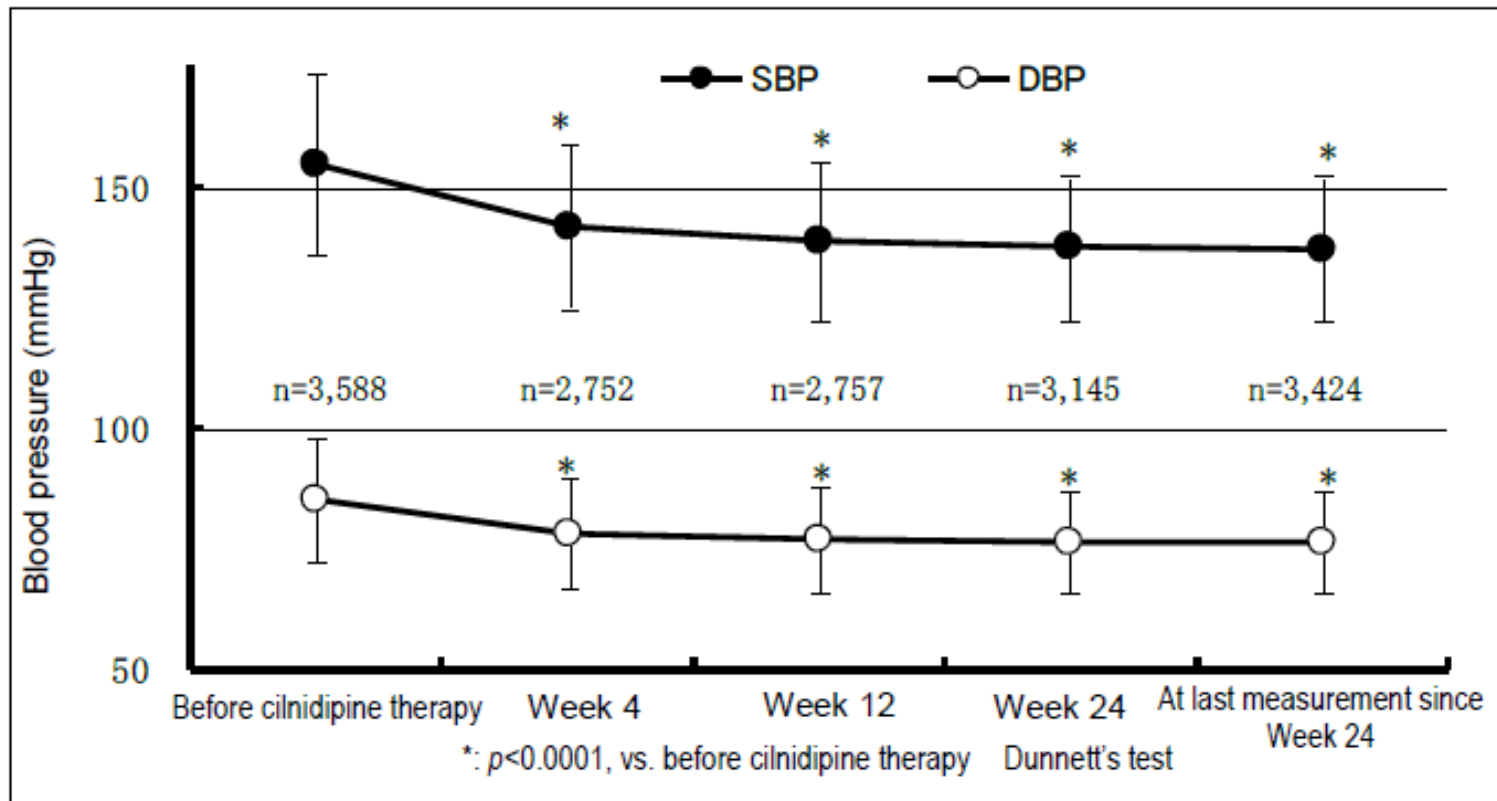


Figure 2 Time course of changes in blood pressure

ATELEC decreased BP in diabetes patients.

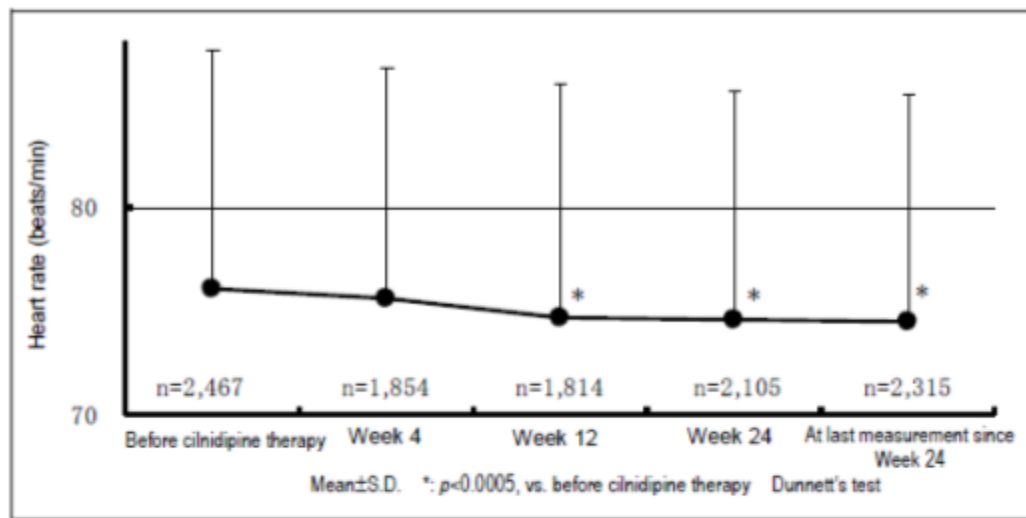


Figure 3 Time course of changes in heart rate

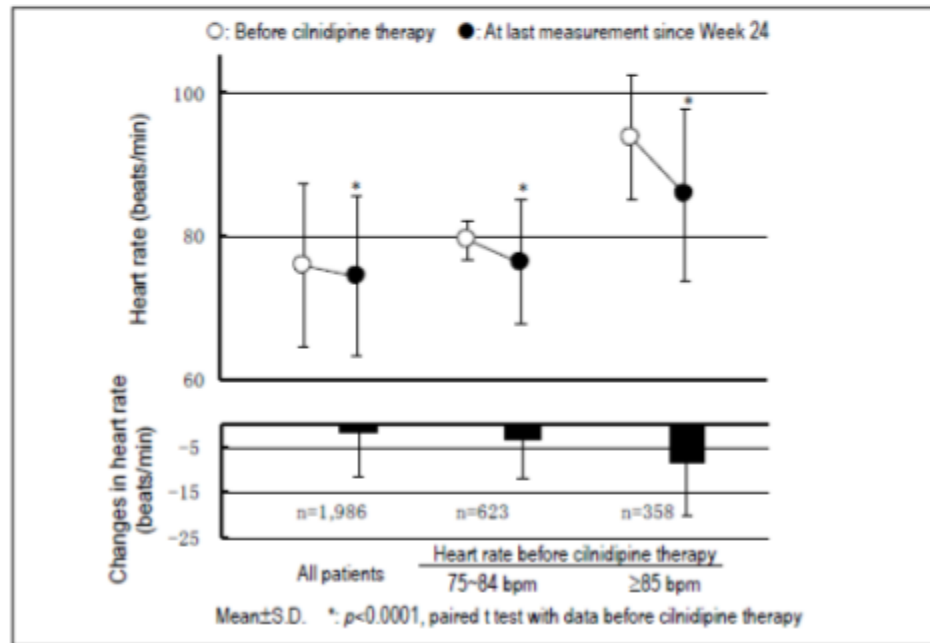


Figure 4 Changes in heart rate by heart rate before cilnidipine therapy

ATELEC decreased HR in diabetes patients

Table 14 Changes in relevant laboratory data by the use of concomitant antidiabetic drugs, drugs for the treatment of hyperuricemia, and hypolipidemic drugs

Parameter	No. of patients	Before cilnidipine therapy	At last measurement since Week 24	Paired t test
HbA1c (%)	2,724	7.0±1.4	6.7±1.1	$p<0.0001$
Antidiabetic drugs: No	1,102	6.7±1.1	6.5±1.0	$p<0.0001$
Untreated <sup>⊗</sup> , HbA1c ≥7.0%	50	8.2±1.3	7.4±0.9	$p<0.0001$
Untreated <sup>⊗</sup> , HbA1c ≥8.0%	23	9.3±1.2	7.7±1.2	$p<0.0001$
Antidiabetic drugs: Yes	1,622	7.3±1.5	6.8±1.2	$p<0.0001$
Postprandial blood glucose (mg/dL)	1,532	181.8±69.1	173.7±66.3	$p<0.0001$
Antidiabetic drugs	No	610	167.5±63.3	$p=0.2014$
	Yes	922	180.0±65.5	$p<0.0001$
Fasting blood glucose (mg/dL)	923	137.7±42.8	129.6±39.8	$p<0.0001$
Antidiabetic drugs	No	403	125.5±35.2	$p=0.0048$
	Yes	520	132.8±42.7	$p<0.0001$
Insulin (μU/mL)	271	15.0±21.9	15.6±45.9	$p=0.8053$
Antidiabetic drugs	No	116	14.2±27.2	$p=0.3658$
	Yes	155	18.2±59.4	$p=0.5572$
Uric acid (mg/dL)	1,716	5.5±1.5	5.6±1.5	$p=0.0339$
Drugs for the treatment of hyperuricemia: No	1,605	5.4±1.4	5.5±1.4	$p=0.0021$
Hyperuricemia (>7.0 mg/dL)	206	7.8±0.8	7.3±1.4	$p<0.0001$
Drugs for the treatment of hyperuricemia: Yes	111	6.6±2.1	6.3±1.8	$p=0.1638$
Hyperuricemia (>7.0 mg/dL)	38	8.6±1.9	7.5±2.1	$p=0.0069$
Total cholesterol (mg/dL)	2,022	204.2±38.2	198.5±47.1	$p<0.0001$
Hypolipidemic drugs	No	1,225	201.0±34.1	$p<0.0001$
	Yes	797	209.1±43.2	$p<0.0001$
HDL cholesterol (mg/dL)	1,824	55.4±16.6	56.5±19.8	$p=0.0023$
Hypolipidemic drugs	No	1,085	55.3±17.0	$p=0.0769$
	Yes	739	56.7±16.5	$p=0.0008$
Triglycerides (mg/dL)	2,166	158.0±116.0	151.0±99.4	$p=0.0019$
hypolipidemic drugs: No	1,313	147.8±98.7	144.2±99.7	$p=0.1876$
Untreated <sup>⊗</sup> , ≥150 mg/dL	62	232.9±134.6	167.1±65.6	$p<0.0001$
Hypolipidemic drugs: Yes	853	173.7±137.1	161.6±98.0	$p=0.0016$

Values are Mean±S.D.

<sup>⊗</sup>: Patients who did not concomitantly use antidiabetic drugs, ARBs, or ACE inhibitors, and who did not undergo diet or exercise therapy

<sup>⊗</sup>: Patients who did not concomitantly use hypolipidemic drugs, α blockers, β blockers, or diuretics, and who did not undergo diet or exercise therapy

# Summary

## **Cilnidipine:**

- ↓ BP & HR in DM patients.
- ↓ HbA1c in untreated DM patients.
- ↓ Uric acid in hyperuricemia patients.
- ↓ Total cholesterol & ↓ Triglyceride in patients not on hypolipidemic drugs.

# Evaluation of efficacy and safety of cilnidipine and losartan in hypertensive patients with type 2 diabetes mellitus

## OBJECTIVE

To compare the efficacy and safety of cilnidipine and losartan in hypertensive patients with type 2 diabetes mellitus (T2 DM).

## MATERIALS AND METHODS

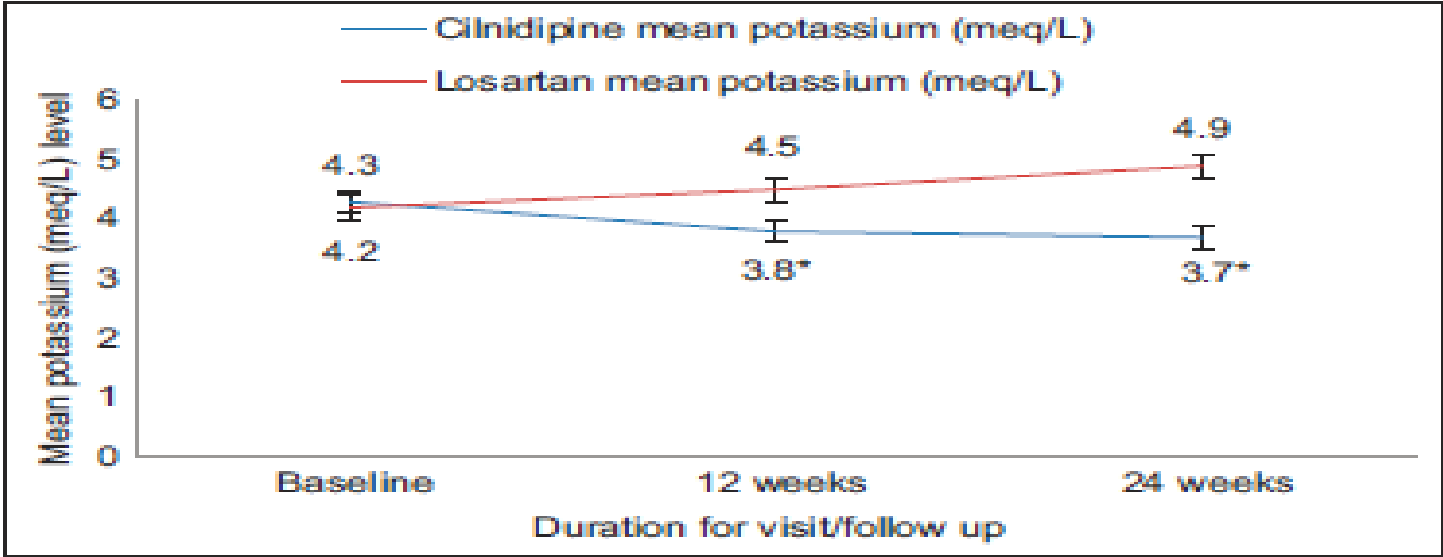
In this observational, prospective study, hypertensive patients with type 2 DM receiving cilnidipine and losartan were included. Demographic details, clinical history, **serum potassium, and urinary albumin** were recorded in a case record form. Patients were followed up every monthly up to 24 weeks and observed for clinical and laboratory parameters and adverse drug reactions (ADRs).

## CONCLUSION

Both cilnidipine and losartan are efficacious and safe in patients with essential hypertension and T2 DM. However, **cilnidipine is more efficacious in the prevention of albuminuria in hypertensive patients with T2 DM and does not cause potassium imbalance**. Losartan is associated with more ADRs such as hyperkalemia, dizziness, and dry cough.

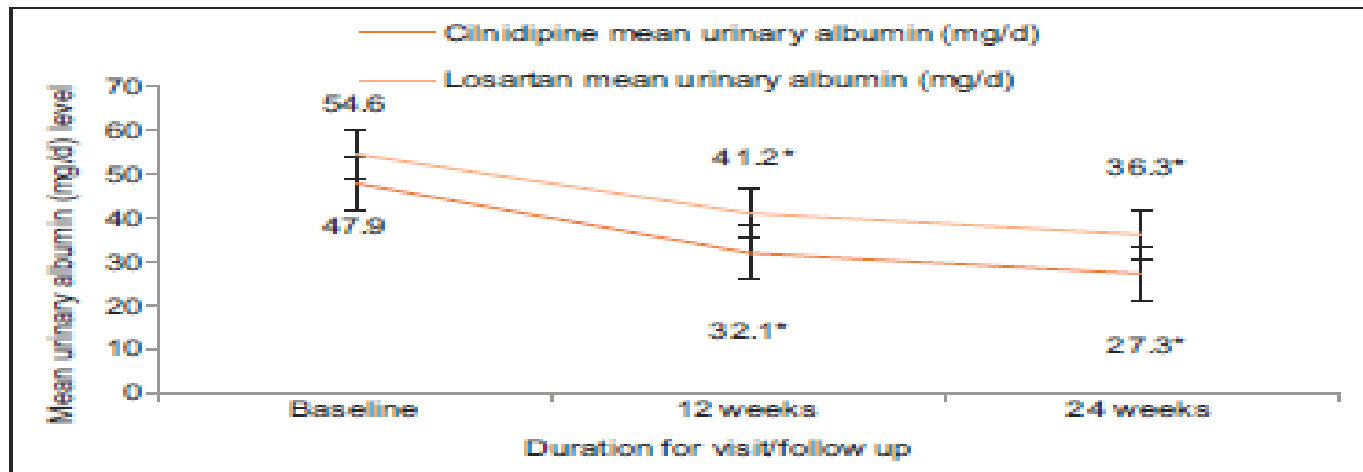


# Evaluation of efficacy and safety of cilnidipine and losartan in hypertensive patients with type 2 diabetes mellitus



**Figure 1:** Mean potassium (meq/L) level in patients treated with cilnidipine and losartan at different time intervals ( $n = 114$ ). \* $P < 0.01$  as compared to baseline (Paired Student's  $t$ -test)

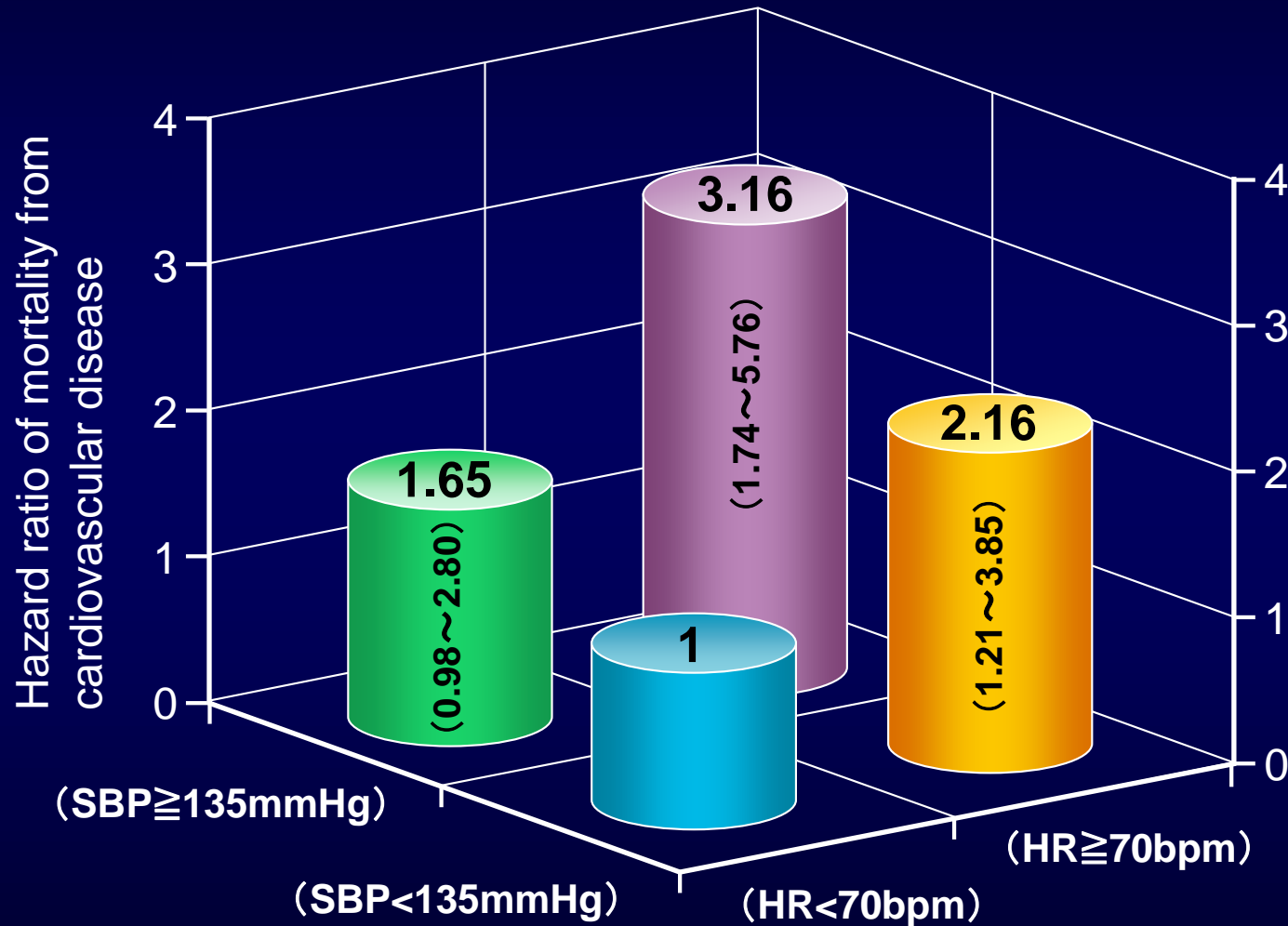
# Evaluation of efficacy and safety of cilnidipine and losartan in hypertensive patients with type 2 diabetes mellitus



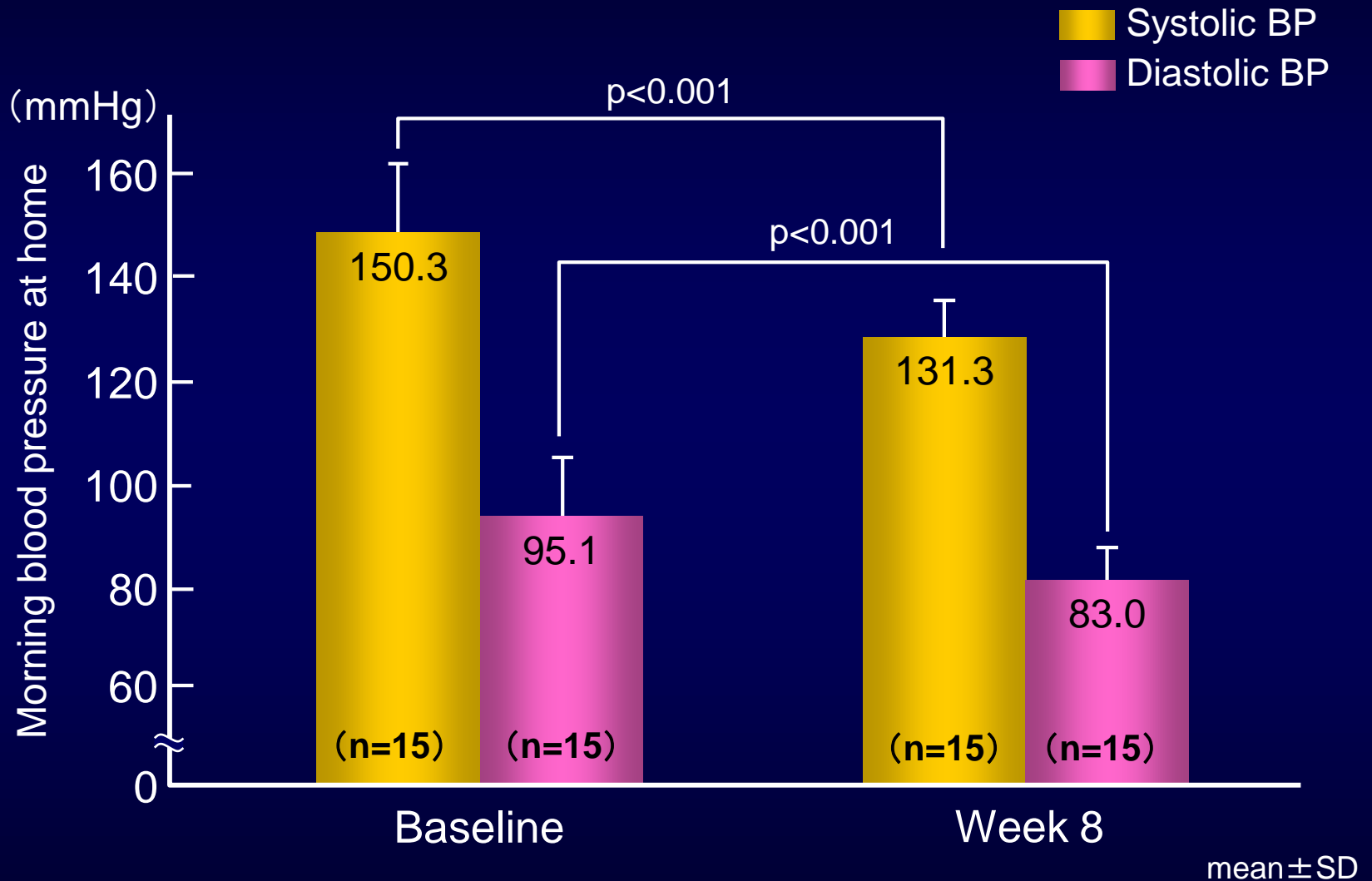
**Figure 2:** Mean urinary albumin (mg/day) level in patients treated with cilnidipine and losartan at different time intervals ( $n = 114$ ). \* $P < 0.05$  as compared to baseline (Paired Student's  $t$ -test)

# Morning blood pressure at home, and heart rate and cardiovascular mortality

(The Ohasama Study)



# Effect of Cilnidipine on morning blood pressure at home



# CCBs and Edema

**Table 1: Incidence of ankle edema with various calcium channel blockers**

Nifedipine <sup>[3]</sup>	6	Lacidipine <sup>[6,7]</sup>	4-4.44
Nifedipine (extended release) <sup>[3]</sup>	10-30	Lercandipine <sup>[7,8]</sup>	1.2-9
Diltiazem <sup>[3]</sup>	6-10	Nicardipine <sup>[4]</sup>	3
Diltiazem (extended release) <sup>[3]</sup>	2-3	Nisoldipine <sup>[9]</sup>	6-19
Felodipine <sup>[3]</sup>	14	Manidipine <sup>[10,11]</sup>	4.9-6
Isradipine <sup>[4,5]</sup>	6	Mibefradil <sup>[12]</sup>	7
Amlodipine <sup>[1]</sup>	6-15		

PC Manoria, Pankaj Manoria, Piyush Manoria, SK Parashar

reading of SPRINT 120 mm Hg will be higher by 10-15 mm Hg, if we record BP in the conventional manner in the clinic. Therefore lower goal of 120 mm Hg systolic of SPRINT cannot be applied in real practice as such. Among drugs used for hypertension, CTD is preferred over hydrochlorthiazide, Azilsartan a new sartan, has additional advantages and CCB Cilnidipine had additional advantage over amlodipine in that it provides renoprotection and has minimal chance of edema. Atenolol is out and currently vasodilatory betablockers are used for treatment of hypertension particularly when it is associated with coronary heart disease and heart failure. Angiotensin Receptor Neprilysin inhibitor is undergoing evaluation in hypertension with lot of

b.



## **Research Article**

# **Replacement of Amlodipine with Cilnidipine and assessment of pedal edema along with blood pressure control**

**Dr. Ravi Shankar Prasad**

Assistant Professor, Department of Medicine, RKDF Medical College, Hospital & Research centre, Jatkhedi, Bhopal  
(M.P.), India

**Abstract:** Amlodipine, an L- type calcium channel blocker (CCB) is the most commonly used antihypertensive drug. Pedal edema is a common adverse effect of amlodipine. Cilnidipine, a newer L/N-type CCB, is also an effective antihypertensive. The Aim of this study was to determine whether cilnidipine can resolve amlodipine-induced edema along with adequate control of hypertension. This was a prospective, observational study done at the tertiary care centre of Central India. A total number of 50 (n = 50) patients of essential hypertension with amlodipine-induced edema of either gender, attending outpatient department of medicine, were included in the study. Concomitant nephropathy, cardiac failure, hepatic cirrhosis, or other causes of edema, and secondary hypertension were excluded by appropriate tests. Amlodipine therapy was substituted in all the cases with an efficacy-equivalent dose of cilnidipine. Clinical assessment of pedal edema and measurement of bilateral ankle circumference, body weight, blood pressure, and pulse rate were performed at onset of the study and after 4 weeks of cilnidipine therapy. At completion of the study, edema had resolved in all the patients. There was a significant decrease in bilateral ankle circumference and body weight ( $P < 0.001$ ). There was no significant change in mean arterial blood pressure and pulse rate. Therapy with cilnidipine resulted in complete resolution of amlodipine-induced edema in all the cases without worsening of hypertension or tachycardia. Cilnidipine is an acceptable alternative antihypertensive for patients with amlodipine-induced edema.

**Keywords:** Ankle edema, Amlodipine, Cilnidipine

## Assessment of Efficacy of Amlodipine with Cilnidipine in Hypertensive Patients: A Comparative Study

---

K. Anantha Babu<sup>1</sup>

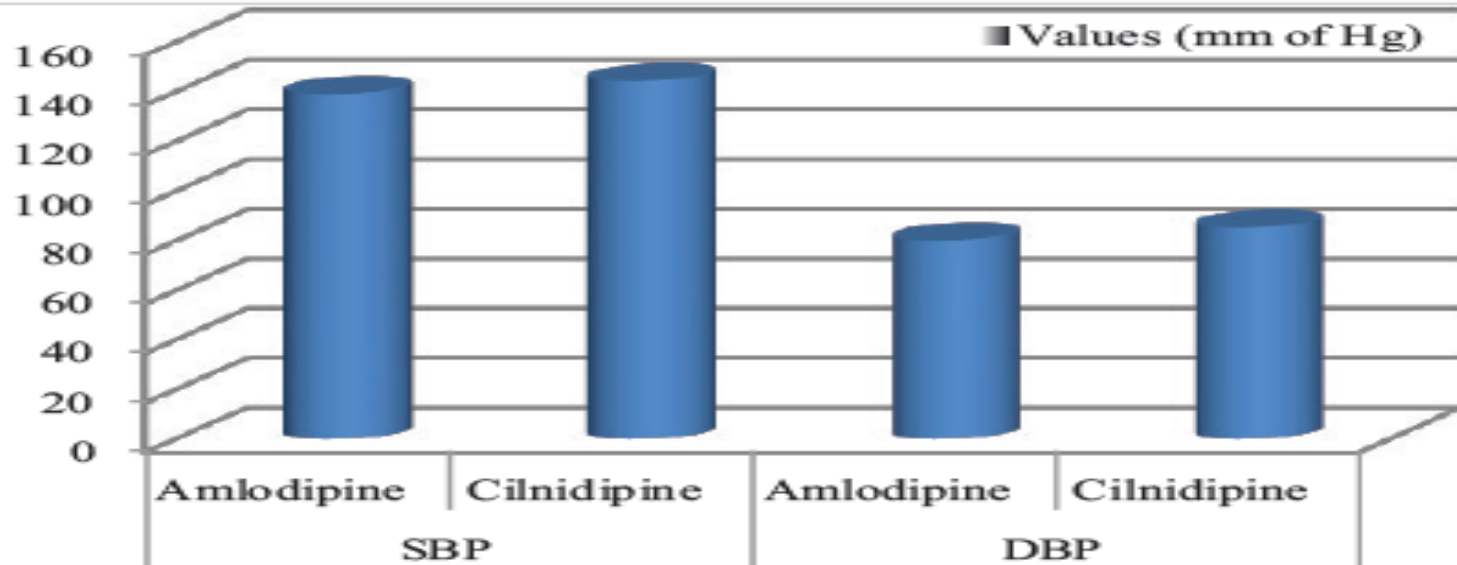
90 hypertensive pts divided into 2 groups:

- G1 (45 pts): Amlodipin 5-10mg qd
- G2 (45 pts): Cilnidipine: 10-20 mg qd<sup>P= NS</sup>

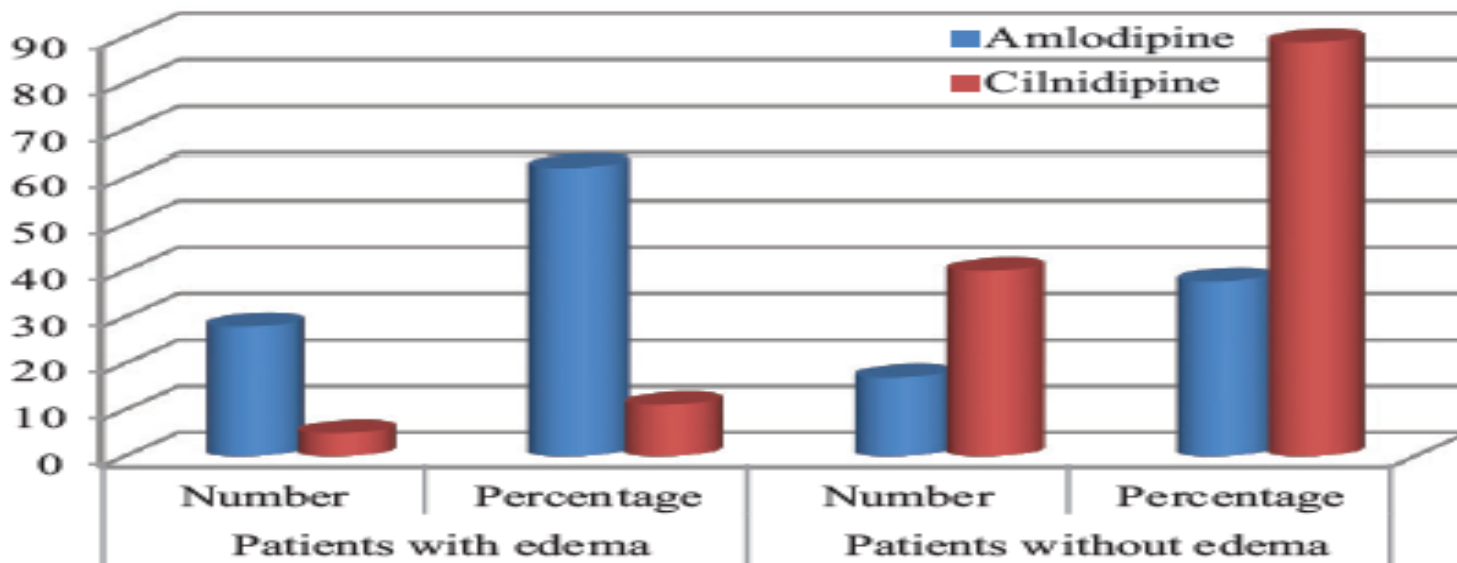
**K. Anantha Babu<sup>1</sup>.** International Journal of Contemporary Medical Research .  
Volume 4 | Issue 4 | April 2017 | ICV (2015): 77.83 | ISSN (Online): 2393-915X;  
(Print): 2454-7379

Parameter		Amlodipine	Cilnidipine
Number of patients		45	45
Mean age (years)		55.2	52.7
Gender	Males	18	18
	Females	27	27
Table-1: Demographic details of the patients			

Blood pressure		Values (mm of Hg)	p-value
SBP	Amlodipine	139.1	0.58
	Cilnidipine	144.2	
DBP	Amlodipine	80.2	0.71
	Cilnidipine	85.3	
SBP: Systolic blood pressure, DBP: Diastolic blood pressure			
Table-2: Comparative evaluation of antihypertensive efficacy of amlodipine with cilnidipine			

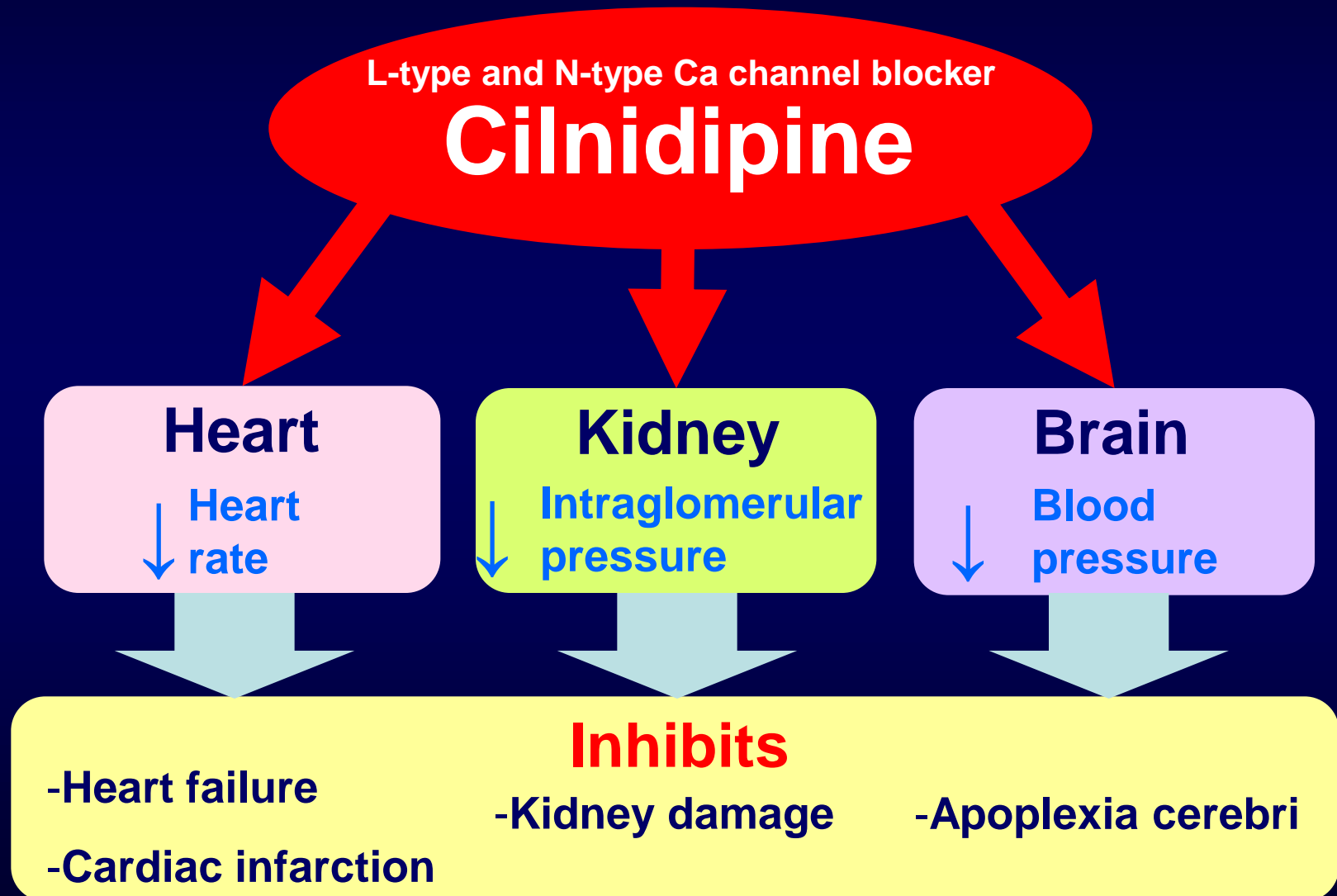


**Graph-1: Antihypertensive efficacy of amlodipine with cilnidipine**



**Graph-2: Patients presenting with pedal edema in both groups**

# Summary of inhibitory action of Cilnidipine on development of cardiovascular disease



# ASCVD Risk Enhancers

- **Family history of premature ASCVD**
- **Primary hypercholesterolemia**
- **Chronic kidney disease**
- **Metabolic syndrome**
- **Conditions specific to women (e.g. preeclampsia, premature menopause)**
- **Chronic inflammatory conditions (especially rheumatoid arthritis, psoriasis, HIV)**
- **Ethnicity (e.g. south Asian ancestry)**

## **Lipid/Biomarkers:**

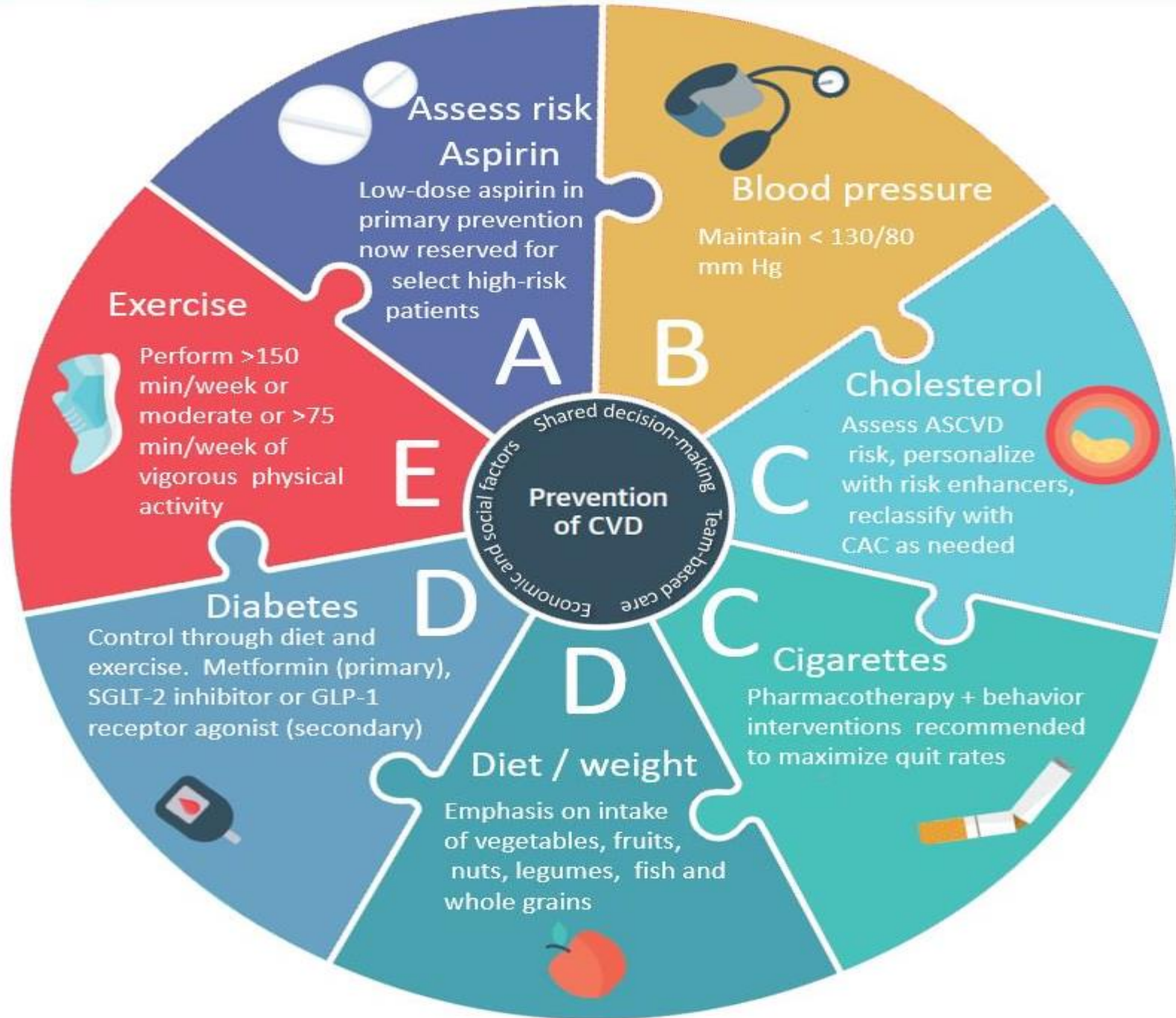
- **Persistently elevated triglycerides ( $\geq 175$ mg/dL)**

## **In selected individuals if measured:**

- **hsCRP  $\geq 2$  mg/L**
- **Lp(a) levels  $\geq 50$  mg/dL or  $\geq 125$  nmol/L**
- **ApoB levels  $\geq 130$  mg/dL**
- **Ankle-brachial index  $< 0.9$**

Alfaddagh A. et al. The ABCs of Primary Cardiovascular Prevention: 2019 Update, May 2019







Thank you for  
your  
attention

