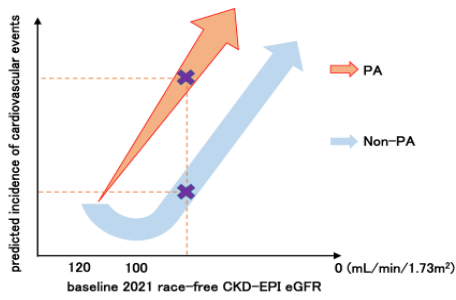


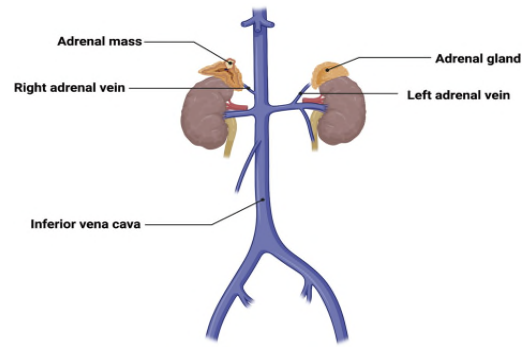
Graphical Abstract Showcase

Aldosterone

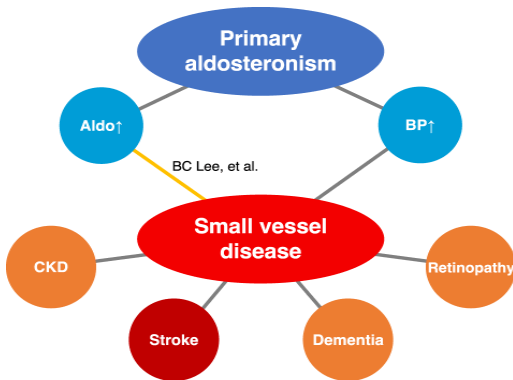


PA patients have early onset of renal impairment, and the smaller the eGFR, the greater the increase in cardiovascular events

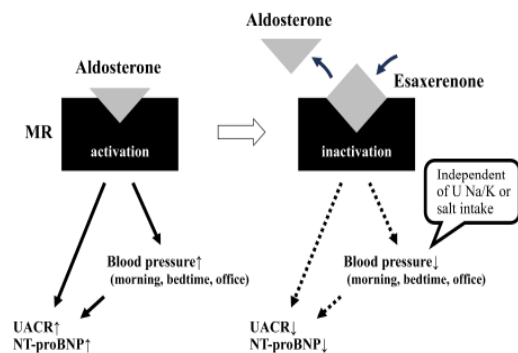
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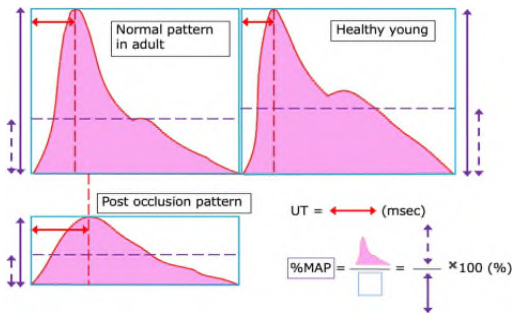


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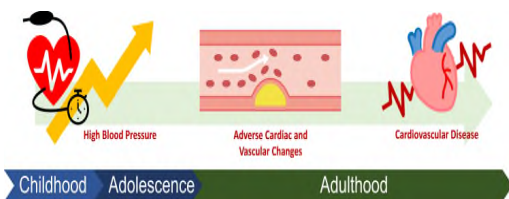
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Blood Vessel

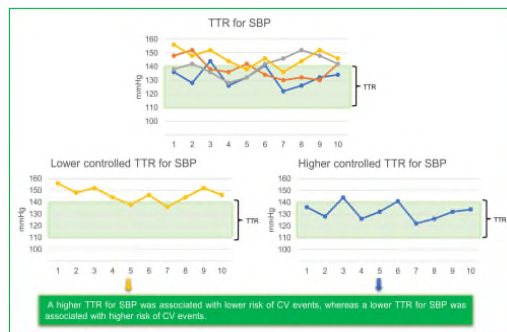


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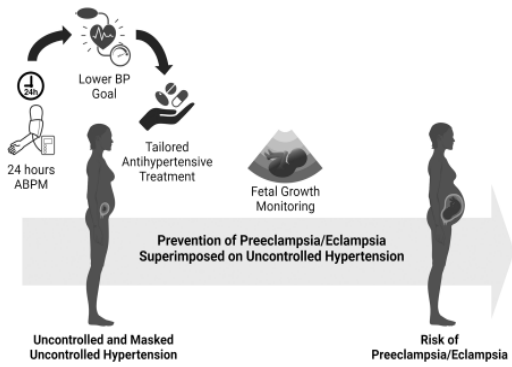
BP Management



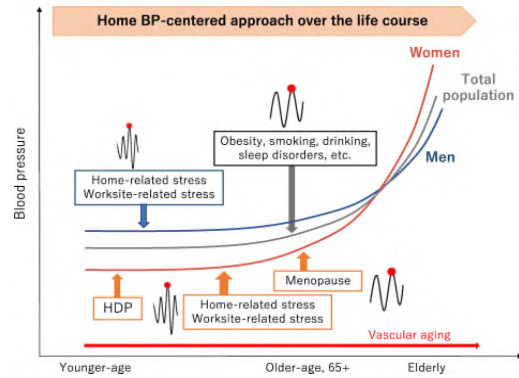
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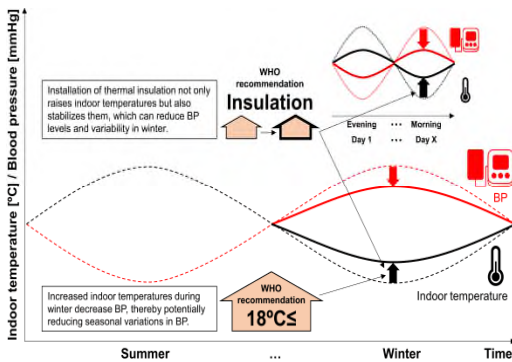
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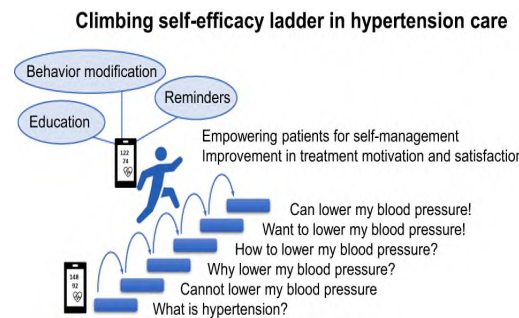
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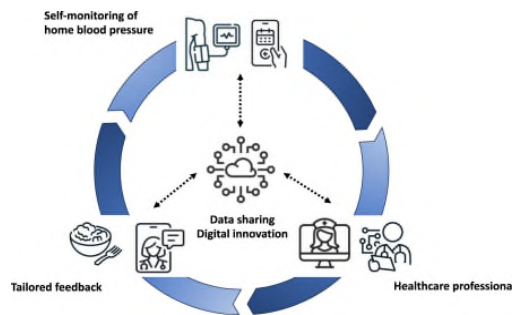
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<https://doi.org/10.1038/s41440-023-01516-3>



<https://doi.org/10.1038/s41440-023-01568-5>

Comparison of three out-of-office blood pressure monitoring methods: ambulatory blood pressure monitoring (ABPM), home blood pressure monitoring (HBPM), and wearable oscillometric wearable blood pressure monitoring (WBPM)

	ABPM	HBPM	WBPM
Wearable (measurement during activity)	✓	N/A	✓
Measurement method	Automatic measurement	Self-measurement	Self-measurement
Situation, posture	Ambulatory	Resting and sitting	Place the device at heart level
Long-term measurement		✓	✓
Short-term BPV	✓	N/A	✓
BPV index	Diurnal BPV Nighttime dipping Morning surge	Day-by-day BPV Seasonal BPV ME difference	Day-by-day BPV Seasonal BPV ME difference Stress-induced BPV
Nighttime measurement	✓	✓ (with specific models)	N/A
Disturbance and restriction	Moderate	Low	Low

<https://doi.org/10.1038/s41440-024-01604-y>

Strengths of IOBP

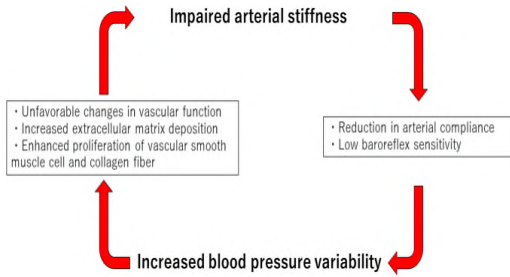
- Automatic OBP measurement.
- Both attended IOBP and unattended IOBP are available.
- No digit preference, no observer bias, no selection bias.
- Automatic uploading of IOBP values and averages to the EHR in real time.
- IOBP data stored in the EHR allows health care providers to evaluate BP trends and BP variability in each patient.

Required further studies concerning IOBP

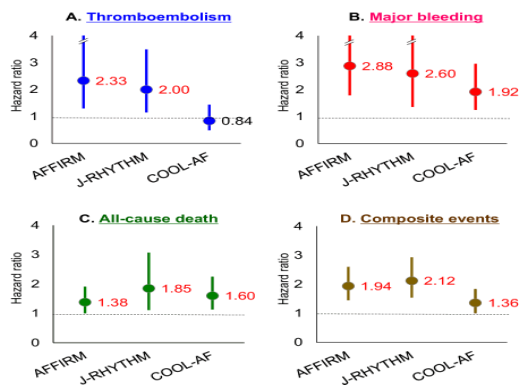
- Diagnostic accuracy of IOBP for hypertension screening.
- Agreement between IOBP, conventional OBP, ABP, and HBP among patients taking antihypertensive medications.
- Association for cardiovascular disease events with IOBP versus conventional OBP, ABP, and HBP.

<https://doi.org/10.1038/s41440-024-01773-w>

BP Variability

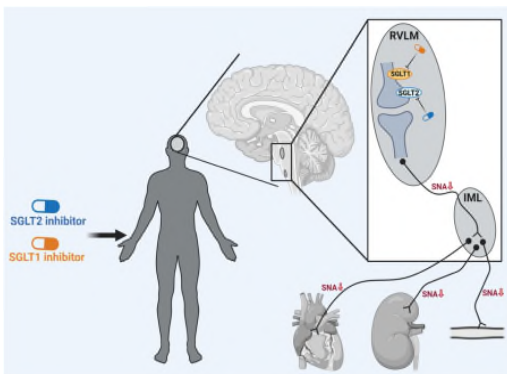


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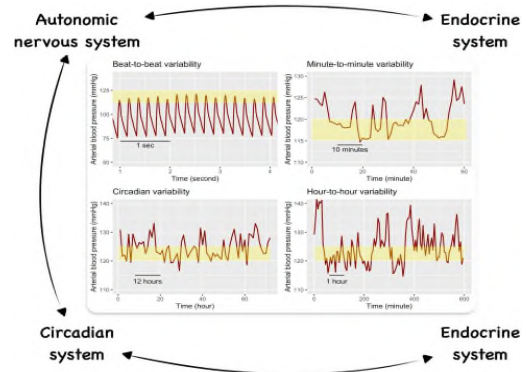


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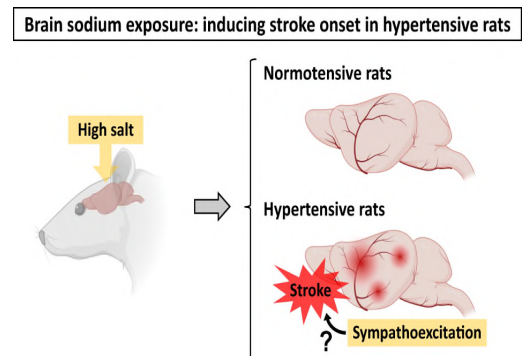
CNS



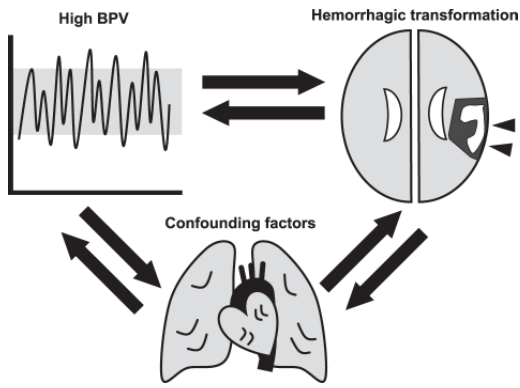
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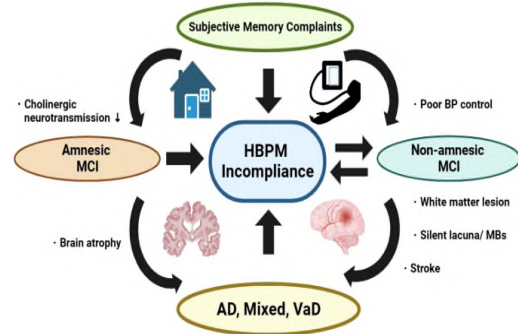
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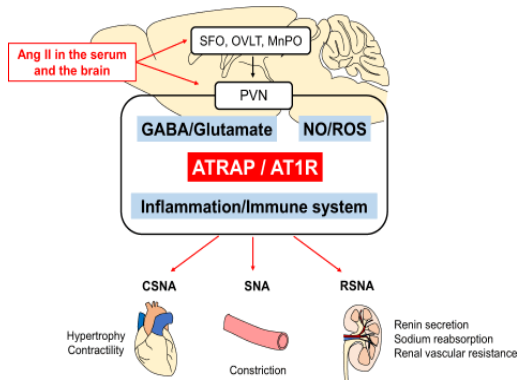
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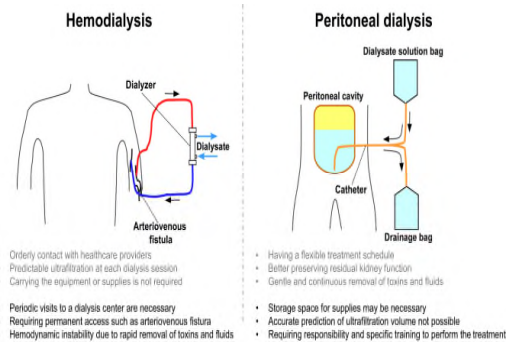
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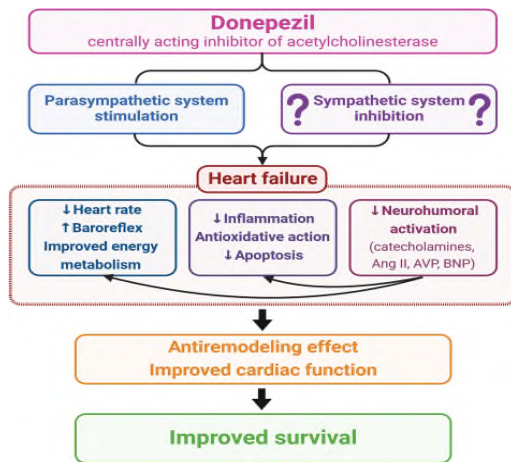
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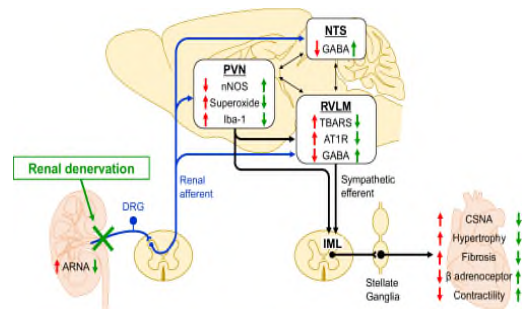
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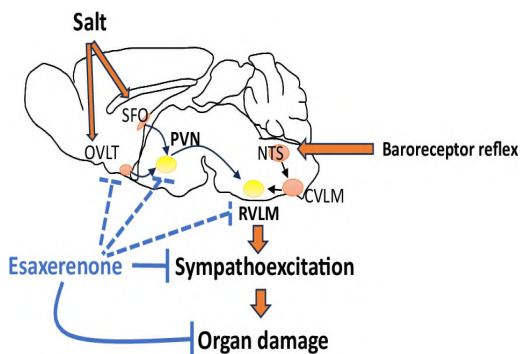
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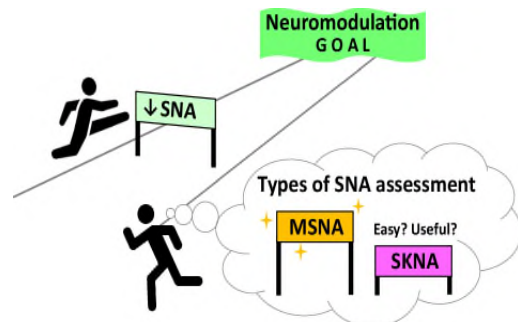
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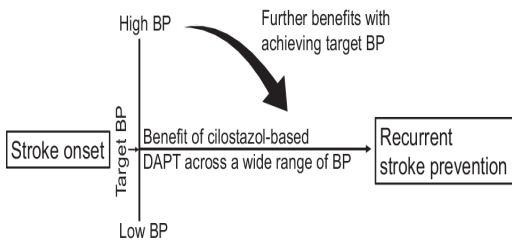
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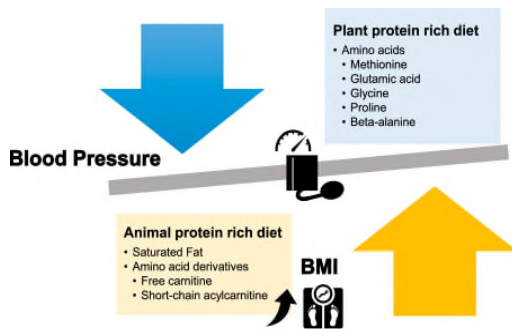


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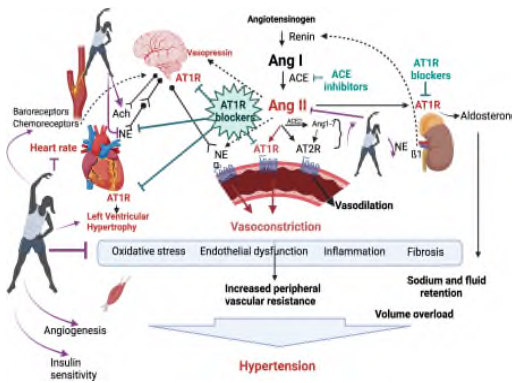
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Diet



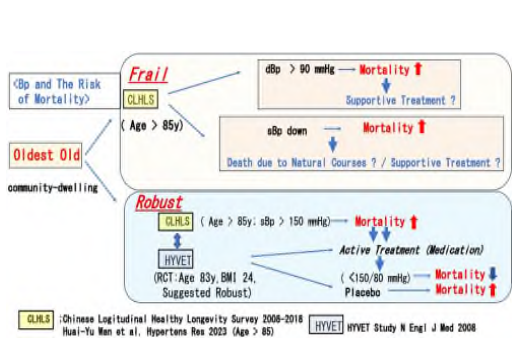
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Exercise

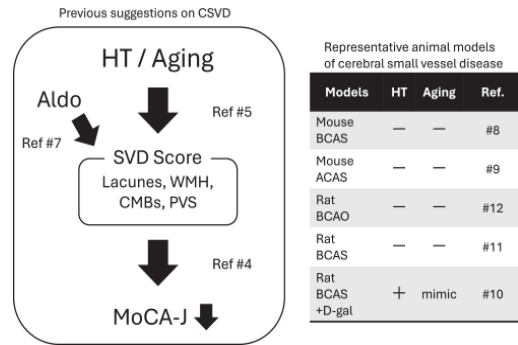


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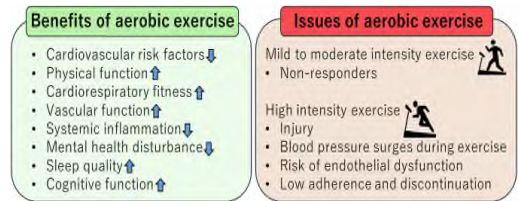
Frailty



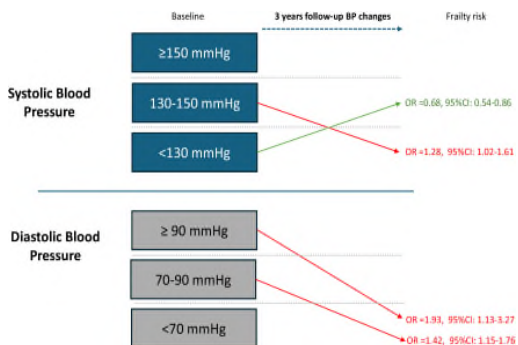
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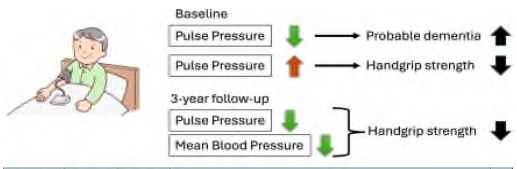
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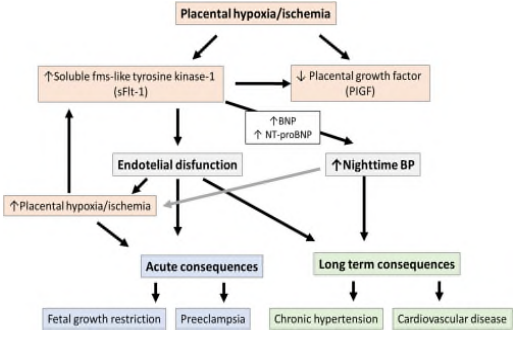
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Authors	Number of subjects	Mean age	Results	Ref#
Ishikawa et al.	425	78.2 ± 6.3	In the baseline study, the lower the PP, the more likely the patient was to have dementia, and the higher the PP, the lower the grip strength. At 3 years from baseline, lower PP and mean blood pressure were associated with lower grip strength.	9
Inoue et al.	515	78	Frail patients had a poor prognosis for cardiovascular events regardless of their BP levels.	2
Wang et al.	13,447	65.7 ± 11.1	SBP <120 mmHg was a risk factor for death in frail elderly patients (>80 years), but SBP >130 mmHg was a risk factor for death in robust younger patients (65-80 years).	3
Yan et al.	310	86.7 ± 3.3	A U-shaped relationship was observed between baseline SBP and PP values and the development of frailty in very elderly persons.	4
Chen et al.	7335	62.6 ± 10.7	Optimal BP levels (SBP: 130-139 mmHg, DBP: 79-89 mmHg) were associated with the lowest risk of frailty in community residents, but lower SBP and DBP were significantly associated with frailty at follow-up.	7
Kabayama et al.	2235	69-71y: 308 72-83y: 372	Lower SBP was associated with a higher prevalence of frailty in older adults in their 80s with 78-83y: 372 anti-hypertensive medication, and higher SBP was associated with lower cognitive function in 69-81y: 248 prior adults in their 70s, while the opposite results were observed in older adults in their 80s.	8

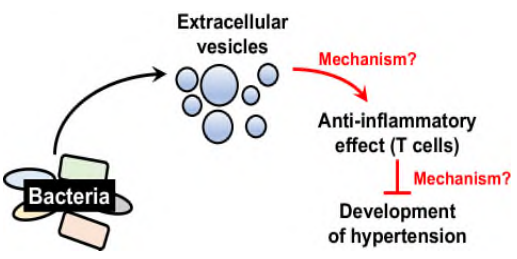
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Gender



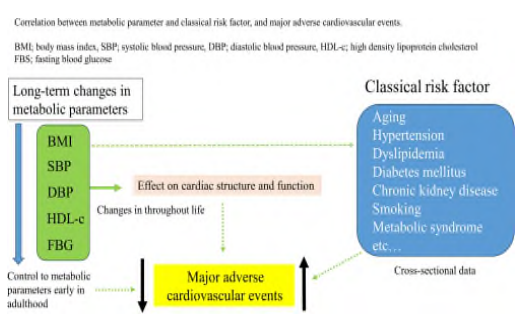
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Gut

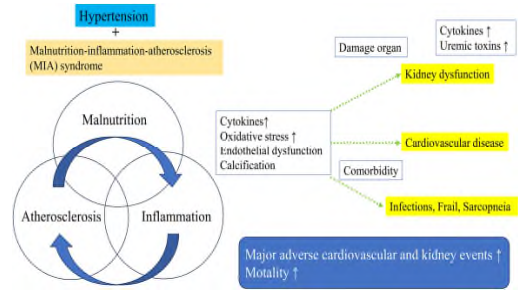


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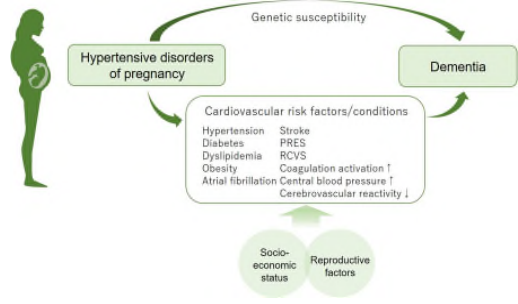
Heart



<https://doi.org/10.1038/s41440-023-01555-w>



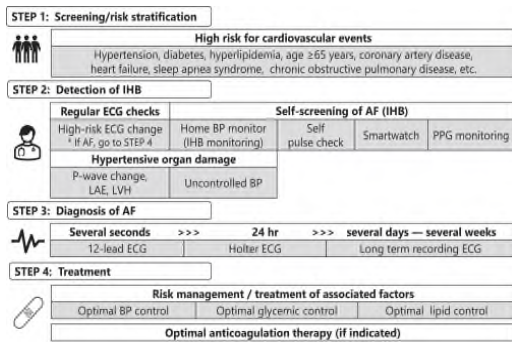
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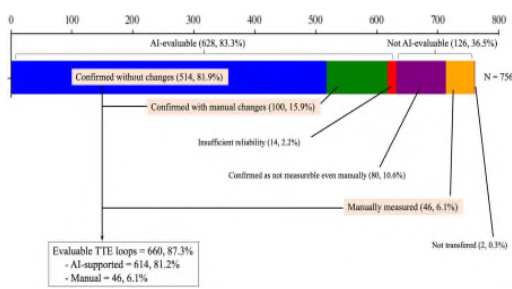
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STEP 1: Screening/risk stratification	
High risk for cardiovascular events Hypertension, diabetes, hyperlipidemia, age ≥65 years, coronary artery disease, heart failure, sleep apnea syndrome, chronic obstructive pulmonary disease, etc.	
STEP 2: Detection of IHB	
Regular ECG checks High-risk ECG change * If AF, go to STEP 4	Self-screening of AF (IHB) Home BP monitor (IHB monitoring) Self pulse check Smartwatch PPG monitoring
Hypertensive organ damage P-wave change, LAE, LVH Uncontrolled BP	
STEP 3: Diagnosis of AF	
Several seconds 12-lead ECG	24 hr Holter ECG
several days — several weeks Long term recording ECG	
STEP 4: Treatment	
Risk management / treatment of associated factors Optimal BP control Optimal glycemic control Optimal lipid control	
Optimal anticoagulation therapy (if indicated)	

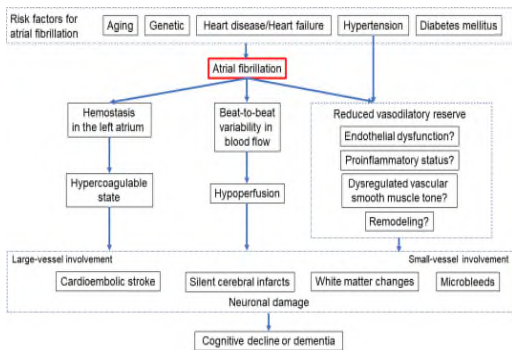
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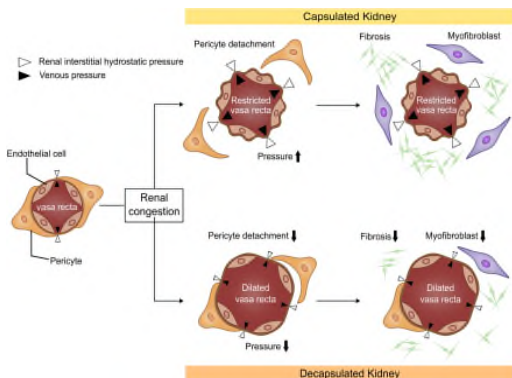


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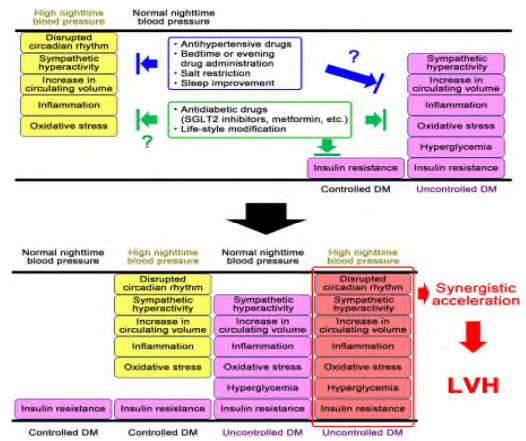


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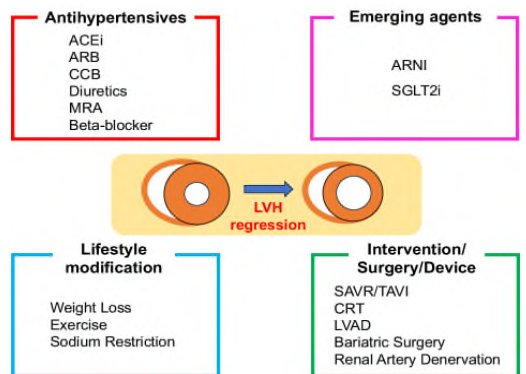
Kidney



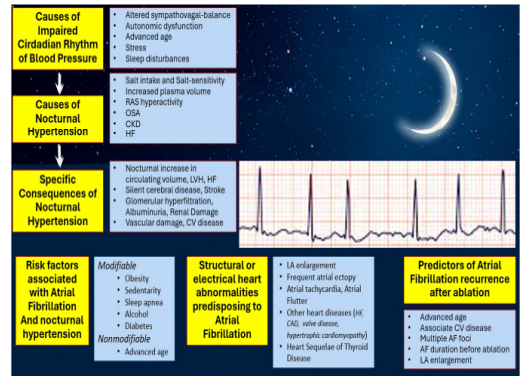
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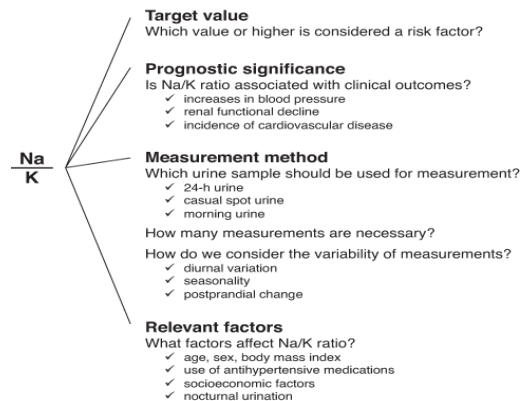
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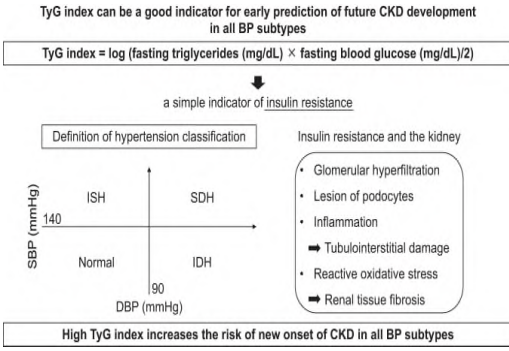
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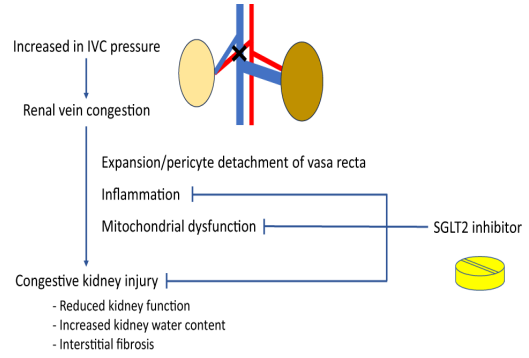
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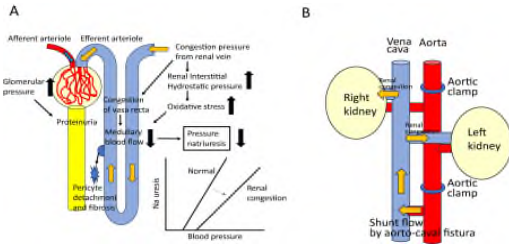
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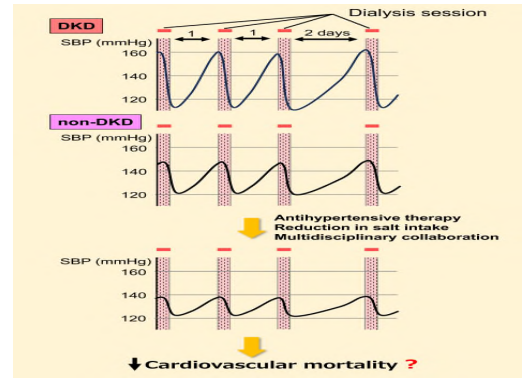
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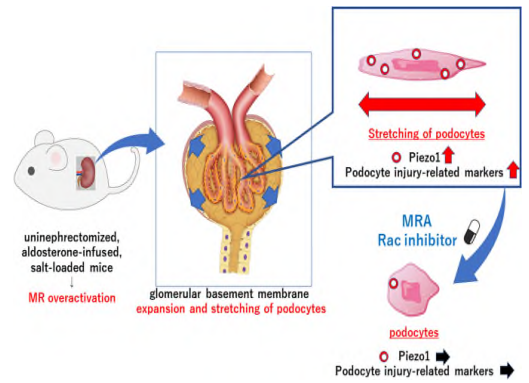
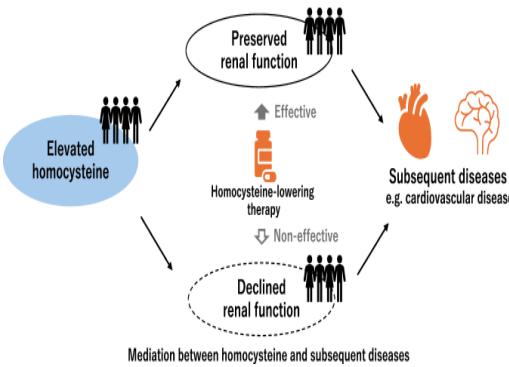
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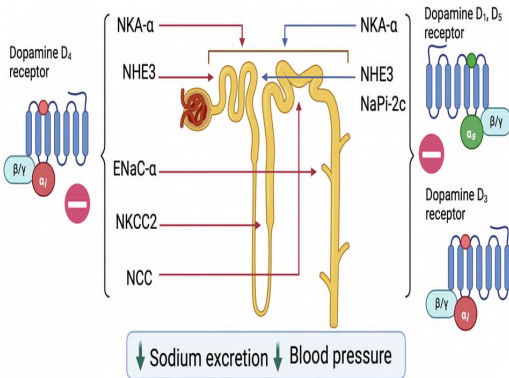
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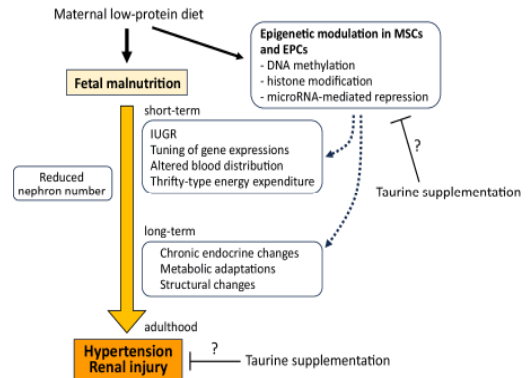


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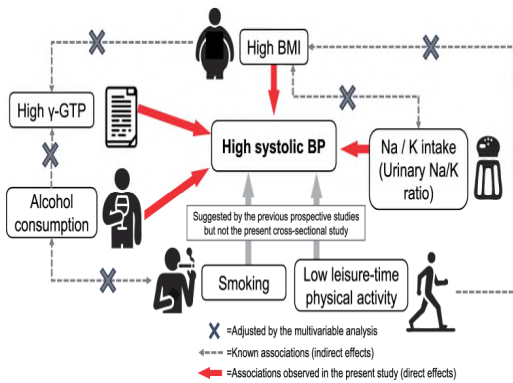
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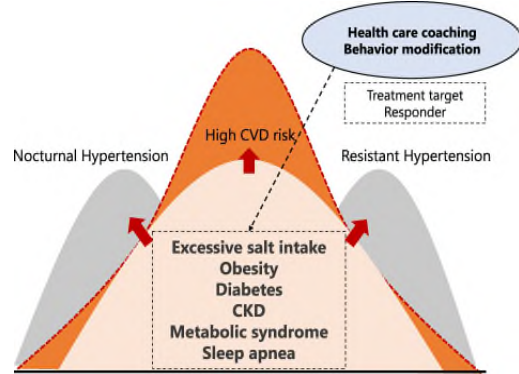


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Life-style



<https://doi.org/10.1038/s41440-024-01639-1>

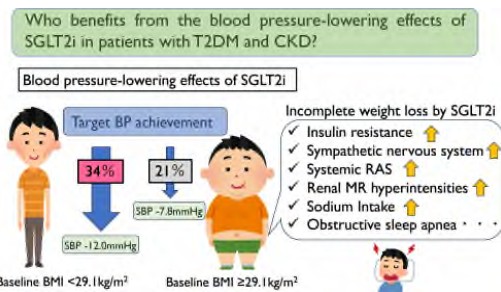


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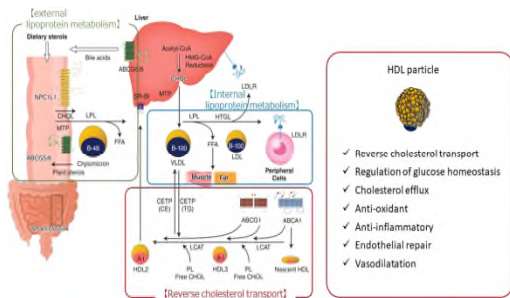
Metabolism

Assessment of insulin resistance	Experimental studies			
	Glucose clamp technique			
	Gold standard for assessing insulin resistance			
	Complicated and expensive			
Large-scale studies				
	HOMA-IR	Matsuda index	Adipo-IR	TyG index
Fasting glucose	✓	✓		✓
Fasting insulin	✓	✓	✓	
Fasting FFA			✓	
Fasting TG				✓
Oral glucose tolerance test		✓		
Tissue specificity	Liver	Liver + Muscle	Adipose tissue	N/A
Rationale	Insulin-induced glucose uptake in the target organ	Insulin-induced glucose uptake in the target organ	Insulin-induced inhibition of lipolysis	Increased TG and glucose levels due to insulin resistance
Cost	Medium	High	Medium	Low

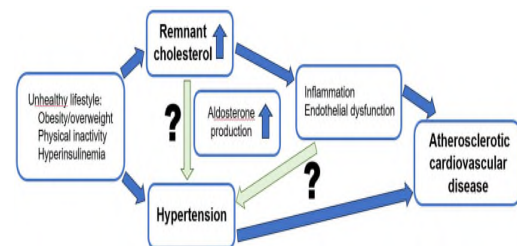
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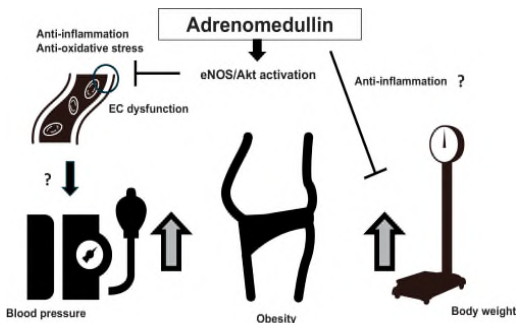
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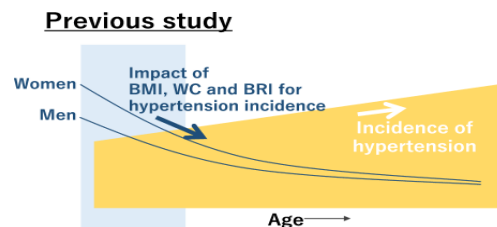
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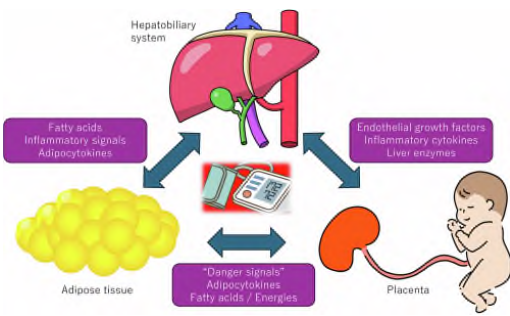


Further study only among young adults

- Combination analysis
- Decision tree analysis
- Developing a risk score

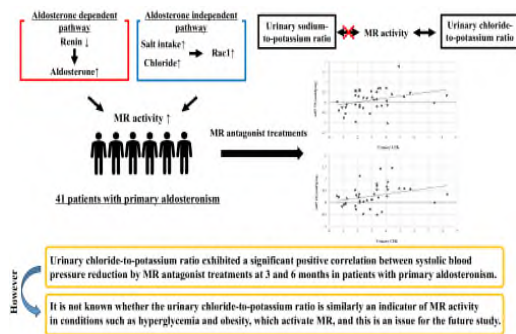
These may be useful to detect high-risk populations for hypertension using multiple anthropometric indices.

<https://doi.org/10.1038/s41440-024-01630-w>



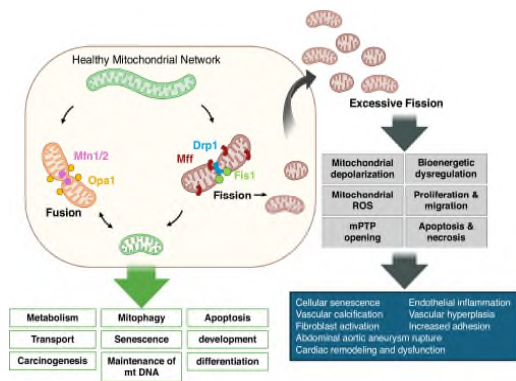
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Mineralocorticoid Receptor



<https://doi.org/10.1038/s41440-024-01757-w>

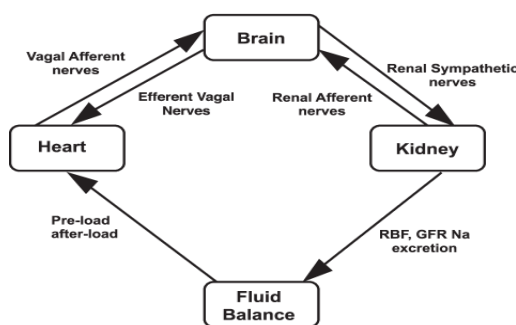
Mitochondria



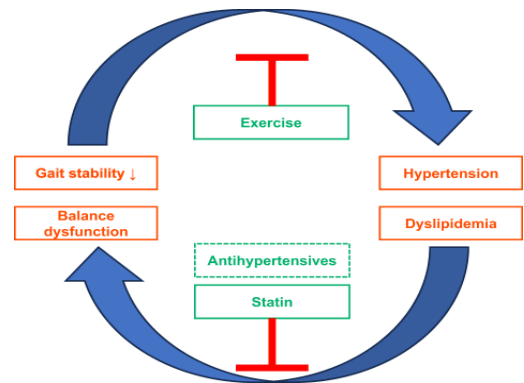
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Organ Network

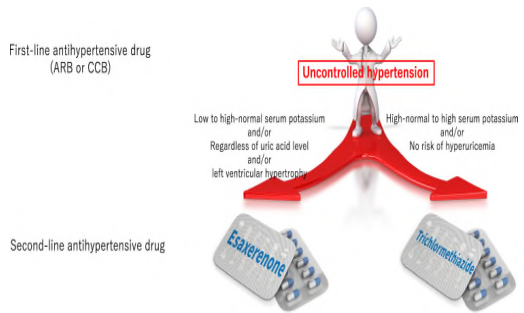
CARDIO-RENAL RELATIONSHIPS



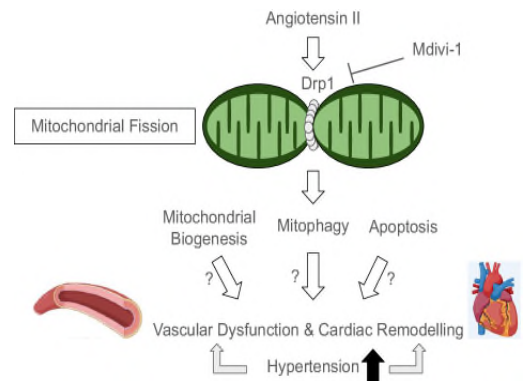
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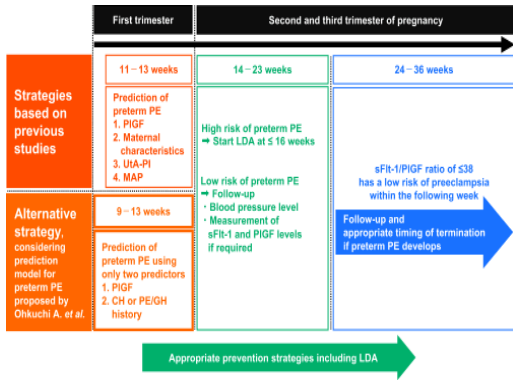


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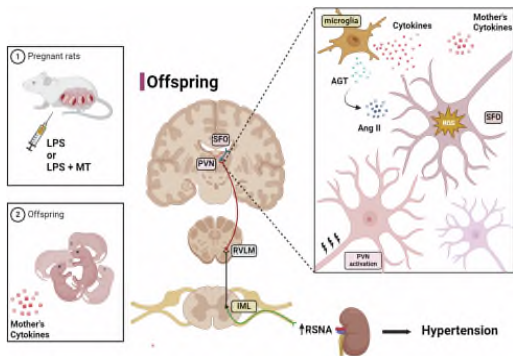


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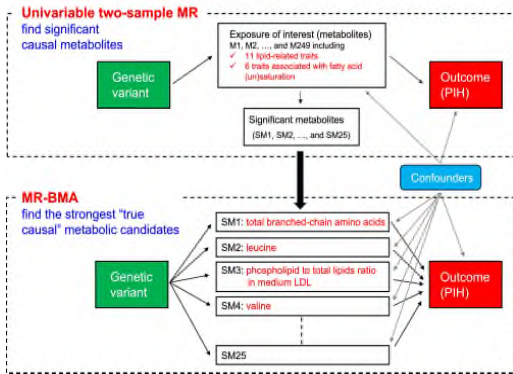
Pregnancy



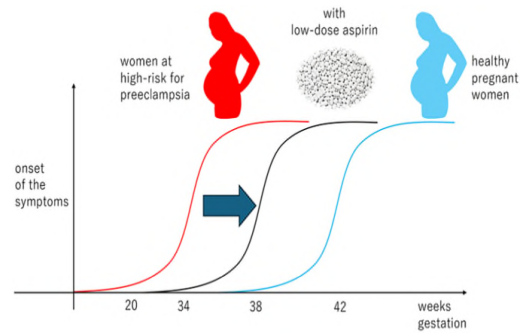
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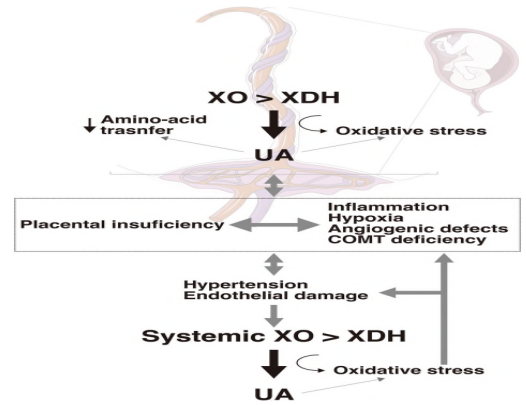
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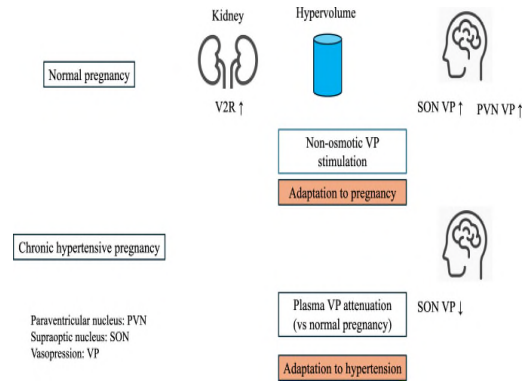
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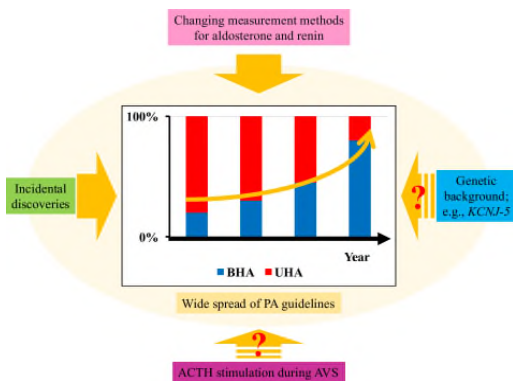


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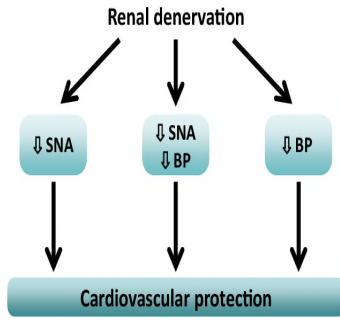
Primary Aldosteronism



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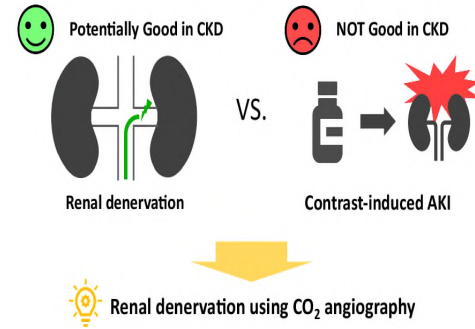
Renal Denervation

Significance of RDN: Different ways to the goal of cardiovascular protection

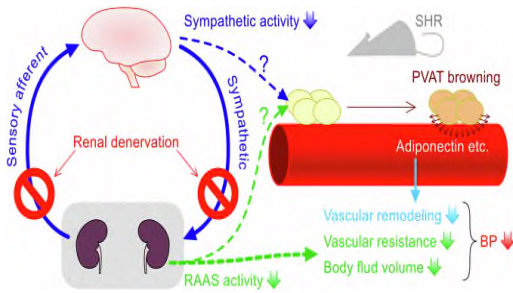


<https://doi.org/10.1038/s41440-024-01689-5>

RDN using CO₂ angiography: a potential solution for RDN in CKD



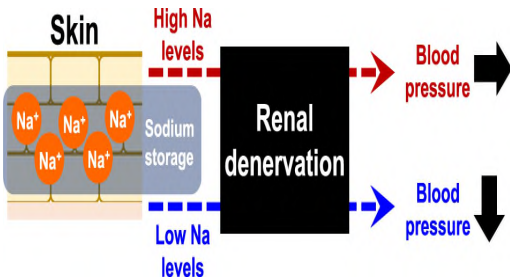
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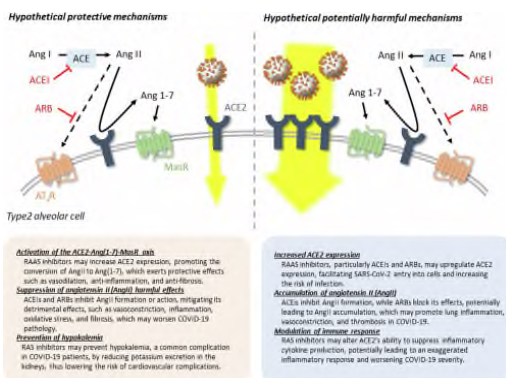


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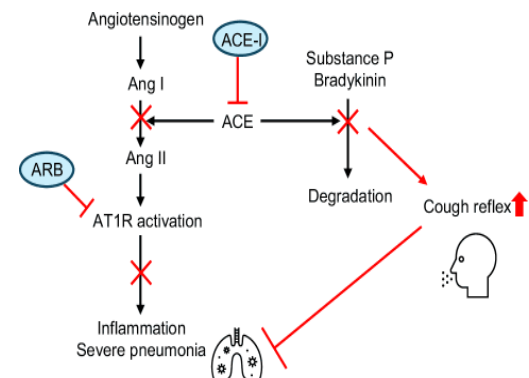


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Renin-angiotensin System

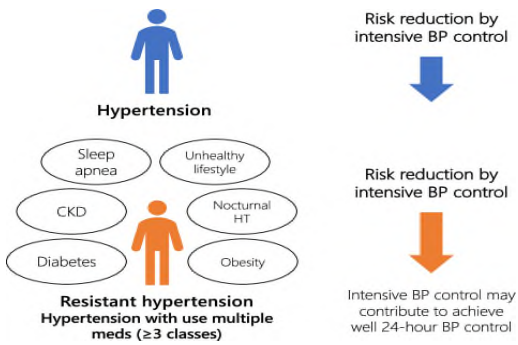


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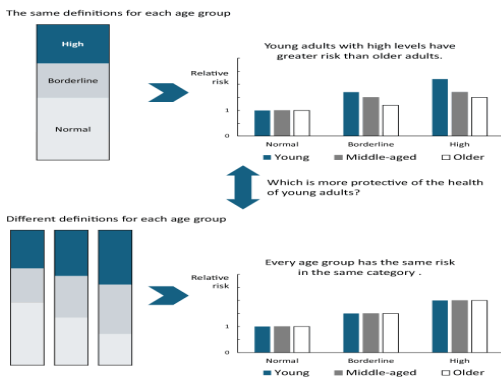
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Resistant Hypertension



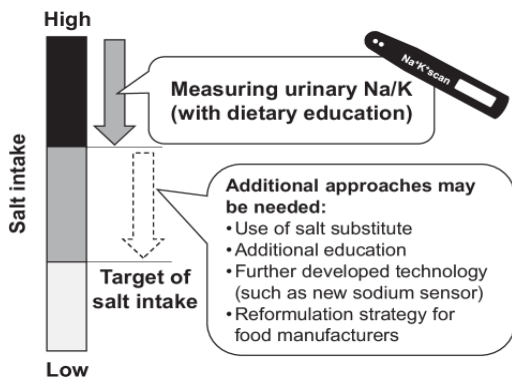
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Risk Factors



<https://doi.org/10.1038/s41440-024-01822-4>

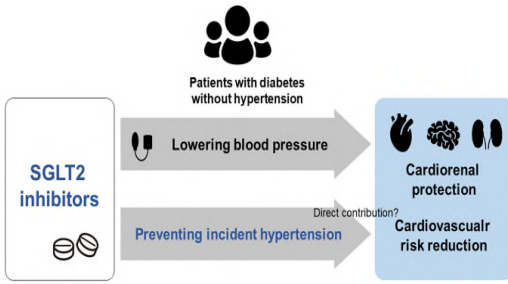
Salt



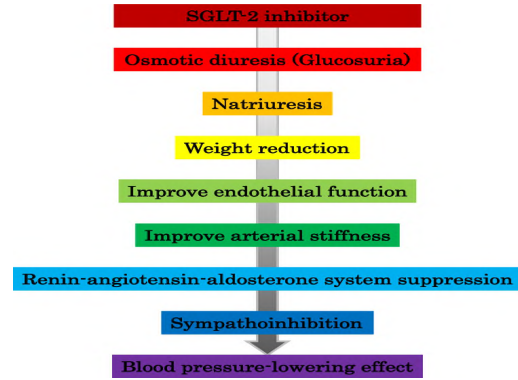
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SGLT-2 Inhibitor

SGLT-2 Inhibitor

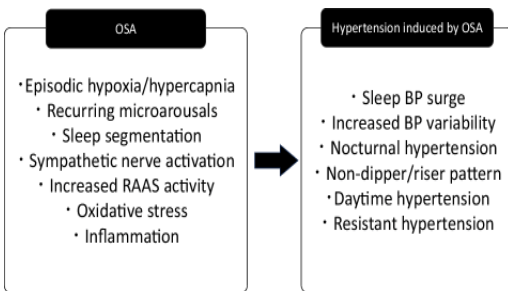


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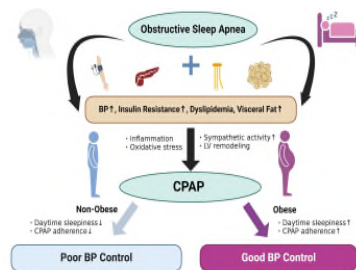


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Sleep

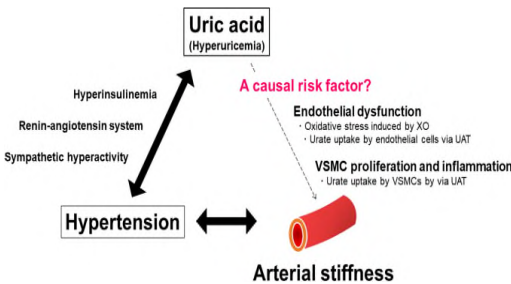


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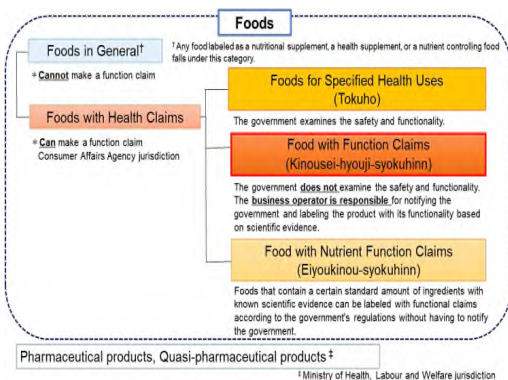
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Uric Acid

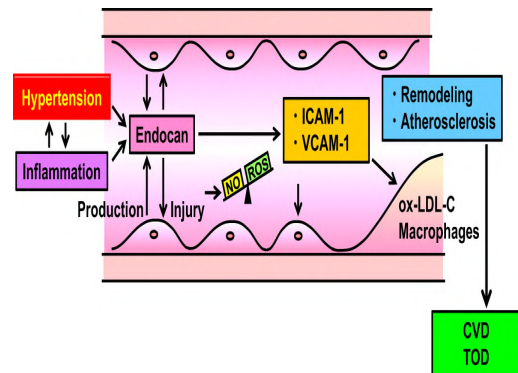


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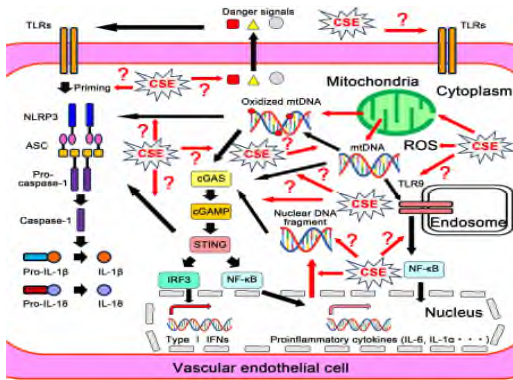
Vascular



<https://doi.org/10.1038/s41440-023-01485-7>

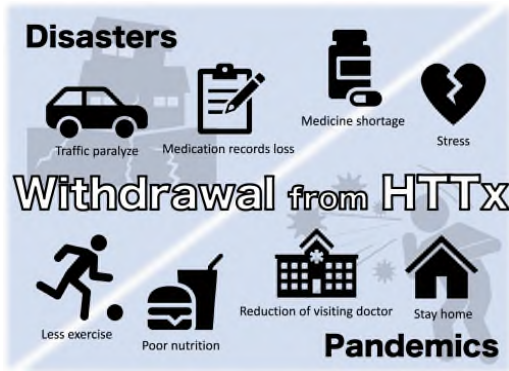


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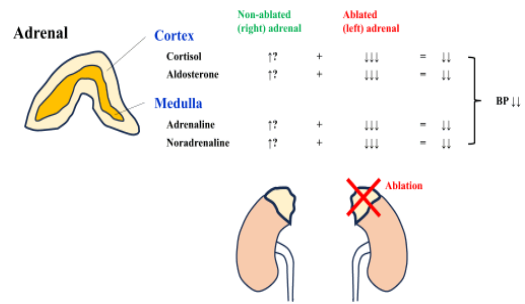


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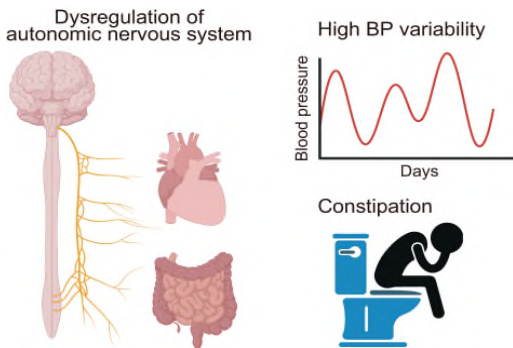
Others



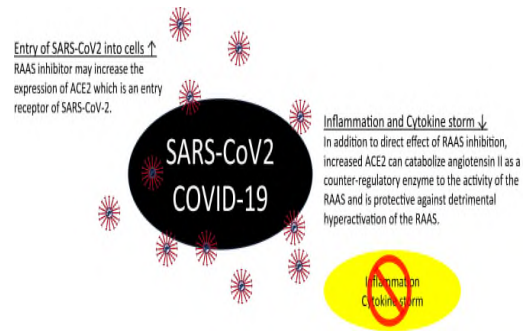
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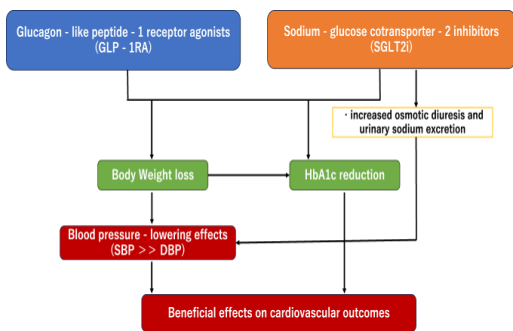
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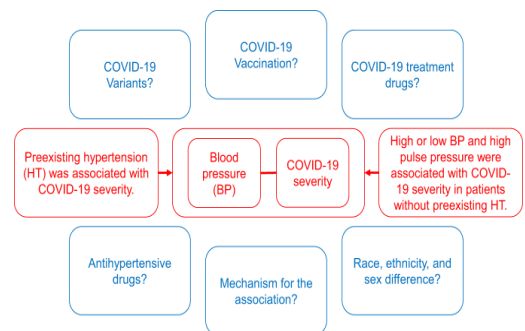
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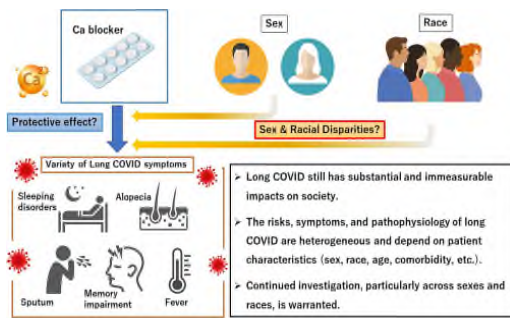
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<https://doi.org/10.1038/s41440-024-01587-w>