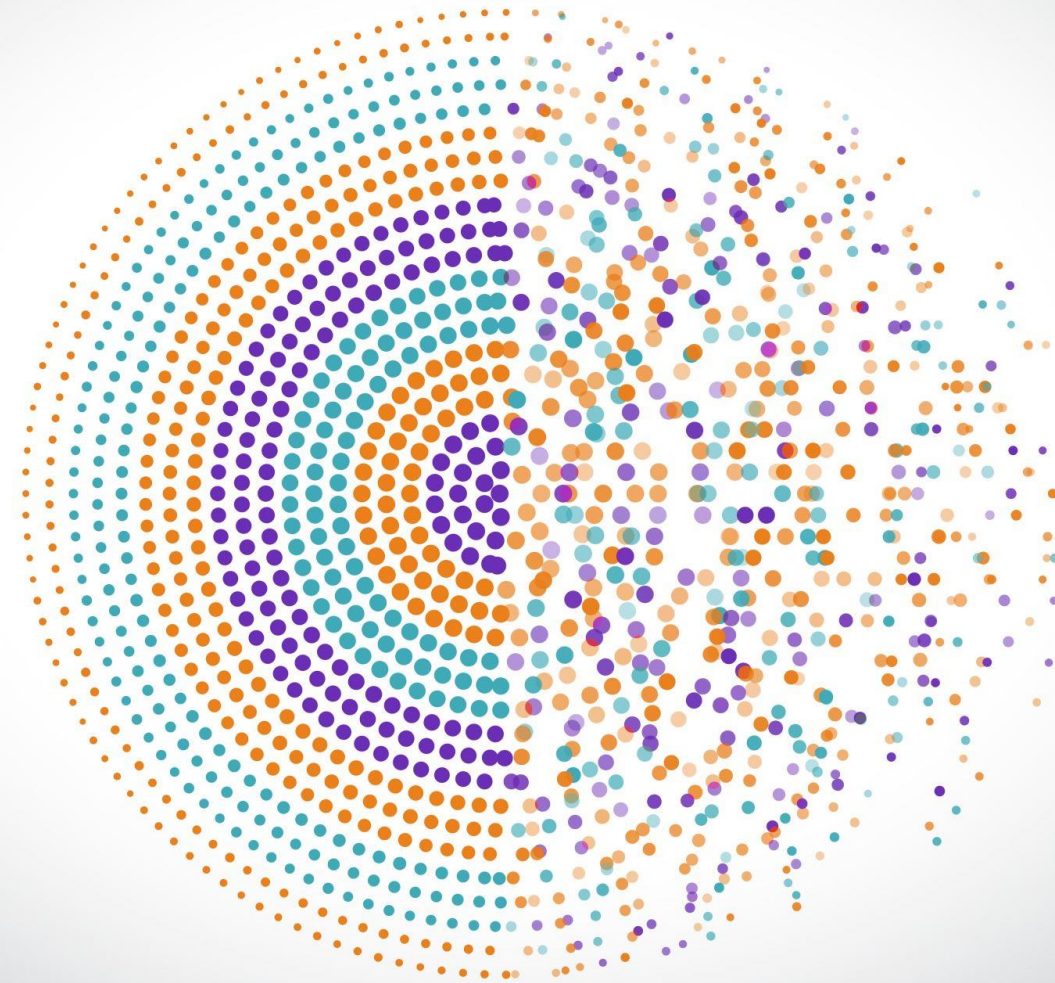


---

# Overcoming the Impact of Hypertension and Diabetes

*THROUGH PREVENTION AND  
EARLY COMPREHENSIVE  
INTERVENTION*



Dr. (Mrs) Phyllis Tawiah, MD, MPH, FGCP, FACP  
Specialist, Internal Medicine & Geriatrics



# Outline

- 01 Define and explain mechanism of developing Hypertension
- 02 Discuss the impact of hypertension on the body
- 03 Discuss steps to reduce blood pressure
- 04 Define and explain mechanism of developing Diabetes mellitus
- 05 Discuss the impact of Diabetes on the body and steps to reduce it.

# Hypertension

The silent killer



# What is Hypertension

---



Hypertension is a medical condition where the force of blood pushing against vessel walls is consistently too high.

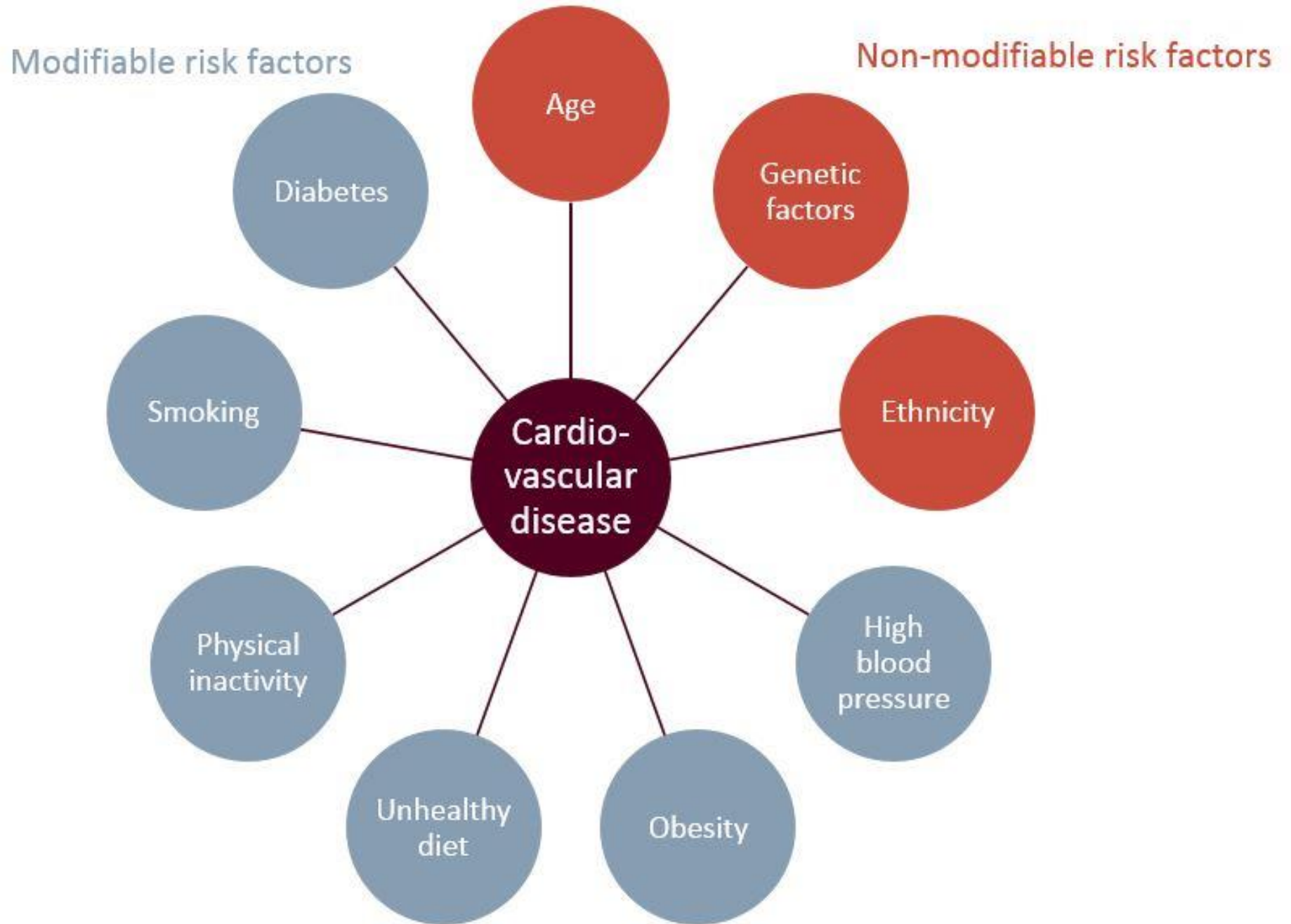


It rarely has any warning signs or symptoms, meaning someone can feel perfectly healthy while their heart and arteries are quietly being strained.



Over time, this constant pressure wears down the body's vessels.

# Risk factors of hypertension



# How hypertension develops; the final pathway

01

Stiffening of Blood Vessels: ageing and lifestyle choices cause arteries to lose their flexibility and become narrow.

02

Excess Fluid Volume: when the body retains too much salt and water, the total amount of fluid in the bloodstream increases,

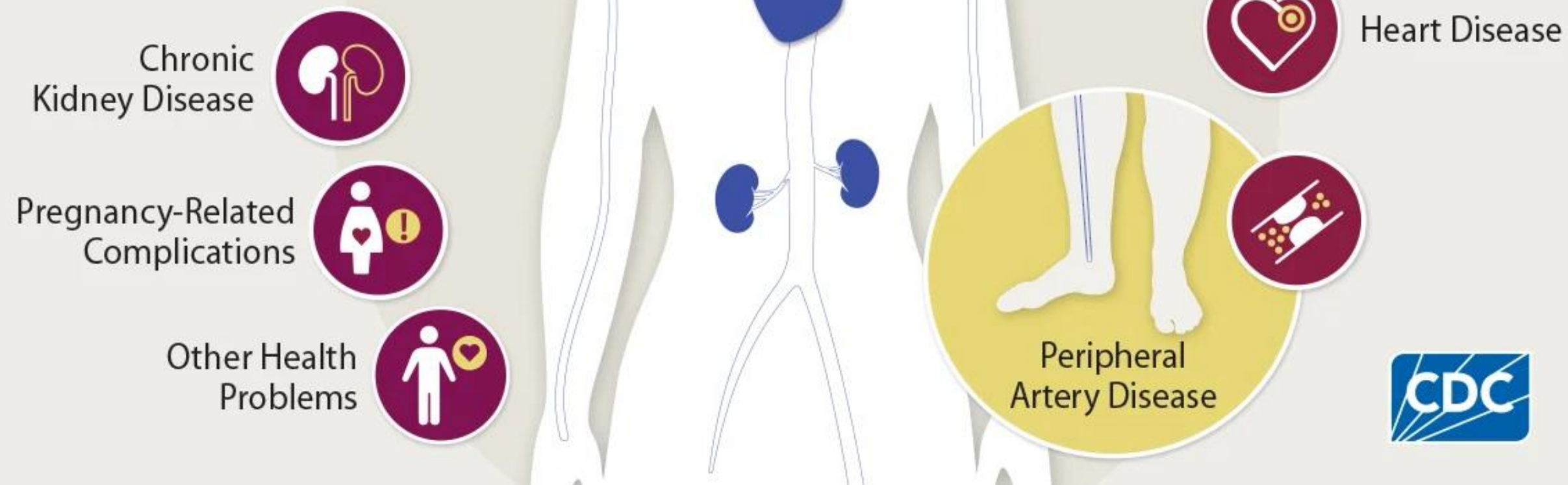
03

The Heart Pumping Harder: to overcome narrow pipes and extra fluid.

# Blood Pressure Categories

<b>BLOOD PRESSURE CATEGORY</b>	<b>SYSTOLIC mm Hg (upper number)</b>		<b>DIASTOLIC mm Hg (lower number)</b>
<b>NORMAL</b>	<b>LESS THAN 120</b>	<b>and</b>	<b>LESS THAN 80</b>
<b>ELEVATED</b>	<b>120 – 129</b>	<b>and</b>	<b>LESS THAN 80</b>
<b>HIGH BLOOD PRESSURE (HYPERTENSION) STAGE 1</b>	<b>130 – 139</b>	<b>or</b>	<b>80 – 89</b>
<b>HIGH BLOOD PRESSURE (HYPERTENSION) STAGE 2</b>	<b>140 OR HIGHER</b>	<b>or</b>	<b>90 OR HIGHER</b>
<b>HYPERTENSIVE CRISIS (consult your doctor immediately)</b>	<b>HIGHER THAN 180</b>	<b>and/or</b>	<b>HIGHER THAN 120</b>

# Health Problems Caused by High Blood Pressure



Hypertension *does not have any symptoms* most of the time

## POSSIBLE SYMPTOMS OF A HYPERTENSIVE EMERGENCY



**Dizziness**



**Severe Headache**



**Vision Problems**



**Nausea and Vomiting**



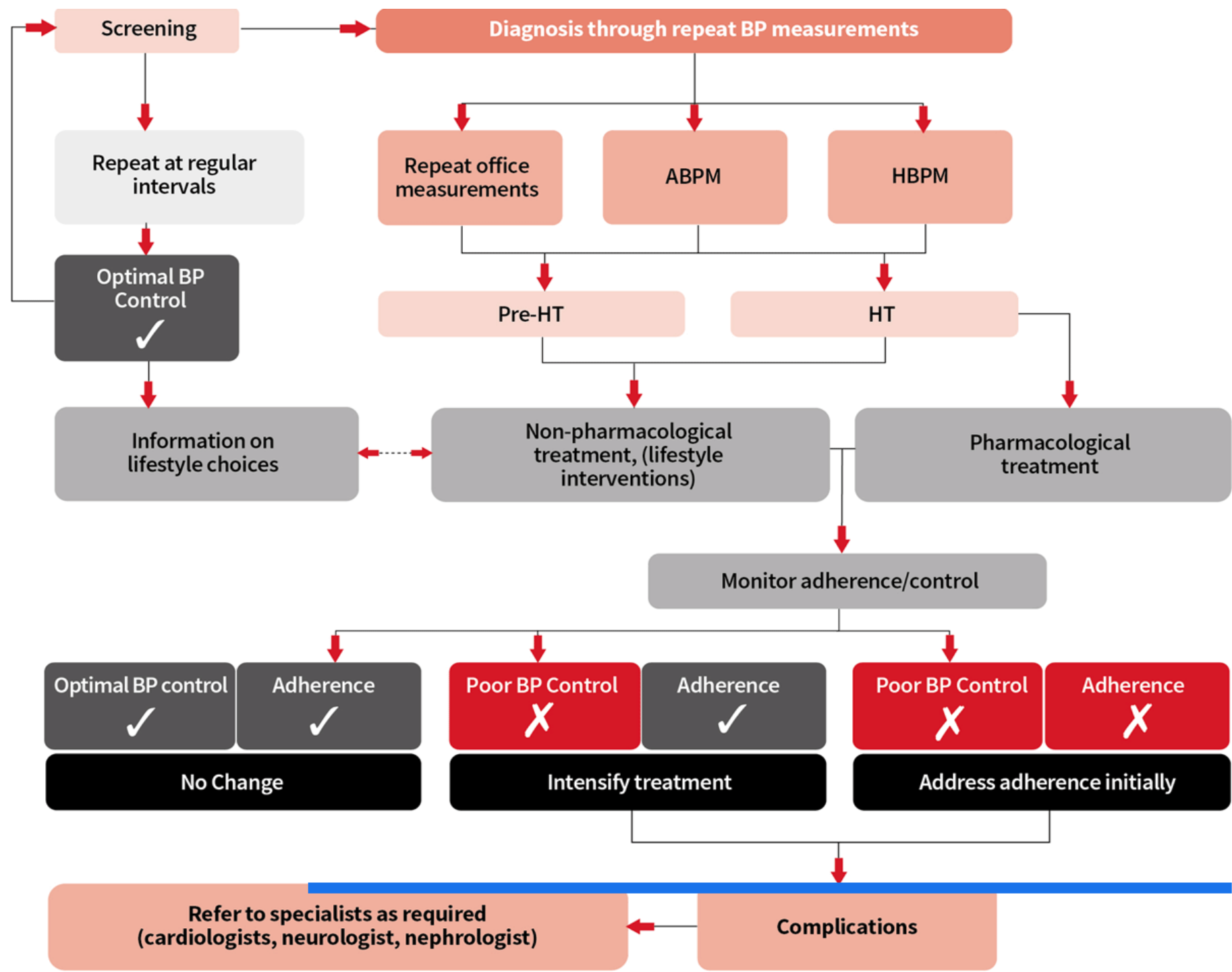
**Trouble Breathing**



**Chest Pain**

# Managing the BP

- This is what you do with your healthcare provider*



**Start****Finish**

Less tight control:	160/94 mm Hg	154/87 mm Hg
Tight control:	161/94 mm Hg	144/82 mm Hg
Average difference:		10/5 mm Hg

	<b>Risk reduction*</b>	<b>P value</b>
Any diabetes-related endpoint	24%	0.0046
Diabetes-related death	32%	0.019
Myocardial infarction	21%	NS
Heart failure	56%	0.0043
Stroke	44%	0.013
Microvascular disease	37%	0.0092

---

# Your role in the Management

- Targeting optimal BP control requires
  - Owning a BP machine, checking and recording
  - Lifestyle modifications
  - Compliance with medications and medical follow-ups.



# Effective hypertension management relies on **5 core lifestyle pillars**

- diet
- exercise
- weight control
- limiting substances
- stress reduction

*Consistent daily habits can significantly lower blood pressure and reduce the risk of heart attacks and strokes.*

---

---

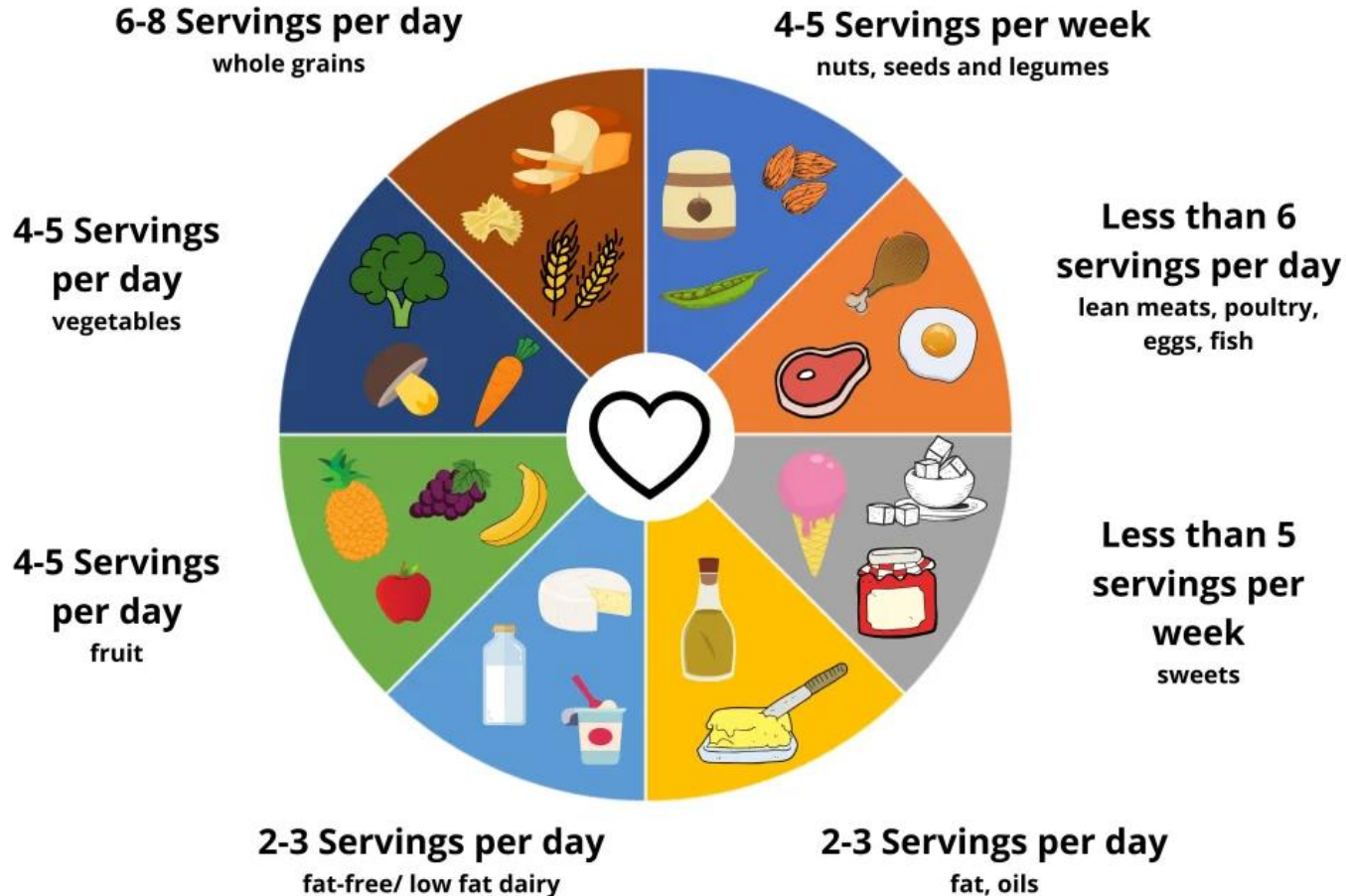
# Dietary Approaches to Stop Hypertension (DASH)

- A heart-healthy eating plan designed to prevent or lower high blood pressure and reduce the risk of heart disease and stroke
- It emphasises whole grains, fruits, vegetables, lean proteins, and low-fat dairy.

## UNDERSTANDING THE DASH DIET



# DASH DIET



2. **Boost Potassium:** Incorporate potassium-rich foods like **bananas, spinach, sweet potatoes, and avocados**, which help your body manage sodium levels

3. **Reduce salt to 2g Sodium**



- Filling low calorie vegetables
- Fruits
- Lean proteins



- Salt
- Added sugars
- Fats

---

# Regular Physical Activity



Exercise helps your heart become more efficient at pumping blood.

- **Aerobic Exercise:** Aim for at least 150 minutes of moderate-intensity aerobic activity per week (e.g., 30 minutes a day, 5 days a week). This includes **brisk walking, jogging, cycling, or swimming.**
- **Strength Training:** Add resistance exercises (like **light lifting or bodyweight movements**) at least two days a week.

---

# Weight Management



Losing excess weight significantly reduces the strain on your heart and arteries.

- **Maintain BMI:** Even a modest weight loss of just 1kg to 2 kg (about 2.2 lbs to 4.4 lbs) can cause a clinically meaningful drop in your blood pressure.

# Substance Limitation



Certain habits cause your blood vessels to constrict and spike your blood pressure.

- **Limit Alcohol:** Reduce consumption to no more than 1 standard drink per day for women and 2 for men.
- **Quit Tobacco:** Smoking and tobacco (**Nicotine**) use cause an immediate, temporary spike in blood pressure and damage blood vessel walls.
- Limit Over-the-counter medications like **NSAIDs, decongestants and caffeine**
- Prescription drugs: **Steroids** through fluid retention, SNRI such as **Venlafaxine and Bupropion**, and ADHD stimulants like **methylphenidate and Amphetamines**. **Estrogen**-containing birth control formulations

# Stress Management & Sleep

Chronic stress keeps your body in a state of fight-or-flight, which drives up blood pressure over time.

- **Mindfulness & Relaxation:** Practice deep breathing, meditation, yoga, or simple paced breathing to regulate your nervous system.
- **Prioritise Sleep:** Aim for 7 to 9 hours of quality sleep per night; poor sleep can negatively affect blood pressure regulation.



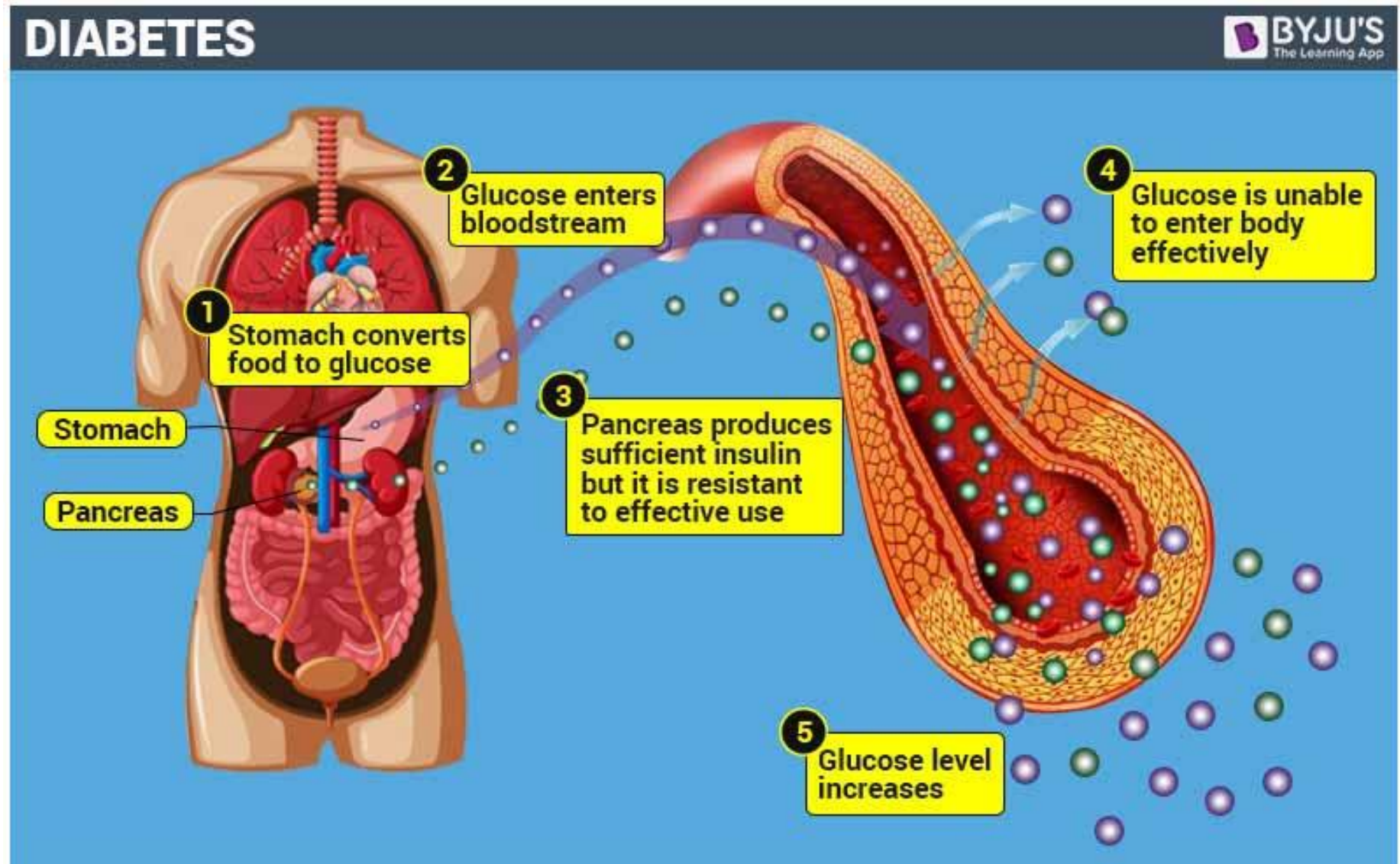
# Diabetes mellitus



a chronic metabolic disease characterised by persistently high blood sugar levels hours after eating











# Why glucose remain high in the blood

*Either the body cannot produce enough insulin or cannot use the insulin effectively*







# Type 1 & Type 2 Diabetes

## How Type 1 and Type 2 Diabetes Differ

Type 1 Diabetes	VS	Type 2 Diabetes	
Body Doesn't Make Enough Insulin		Body Doesn't Respond to Insulin	
Caused by Immune System Reaction		Lifestyle Factors and Genetics Contribute	
Often Starts in Childhood		More Common in Middle Age	
Symptoms Come on Quickly		Symptoms Develop Slowly	
Treated With Insulin Injections		Managed With Drugs and Lifestyle Changes	

# What are the cut offs?

	Prediabetes		T2D	
				
Fasting glucose	6.1mmol/L	100mg/dL	7.0mmol/L	126mg/dL
2-hour glucose	7.8mmol/L	140mg/dL	11.1mmol/L	200mg/dL
Random glucose	-	-	11.1mmol/L	200mg/dL

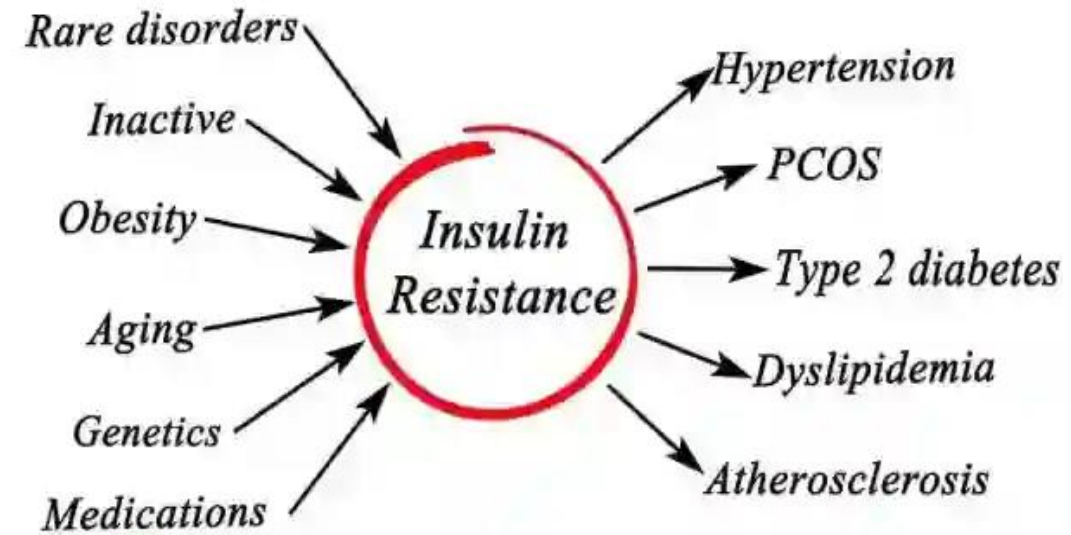
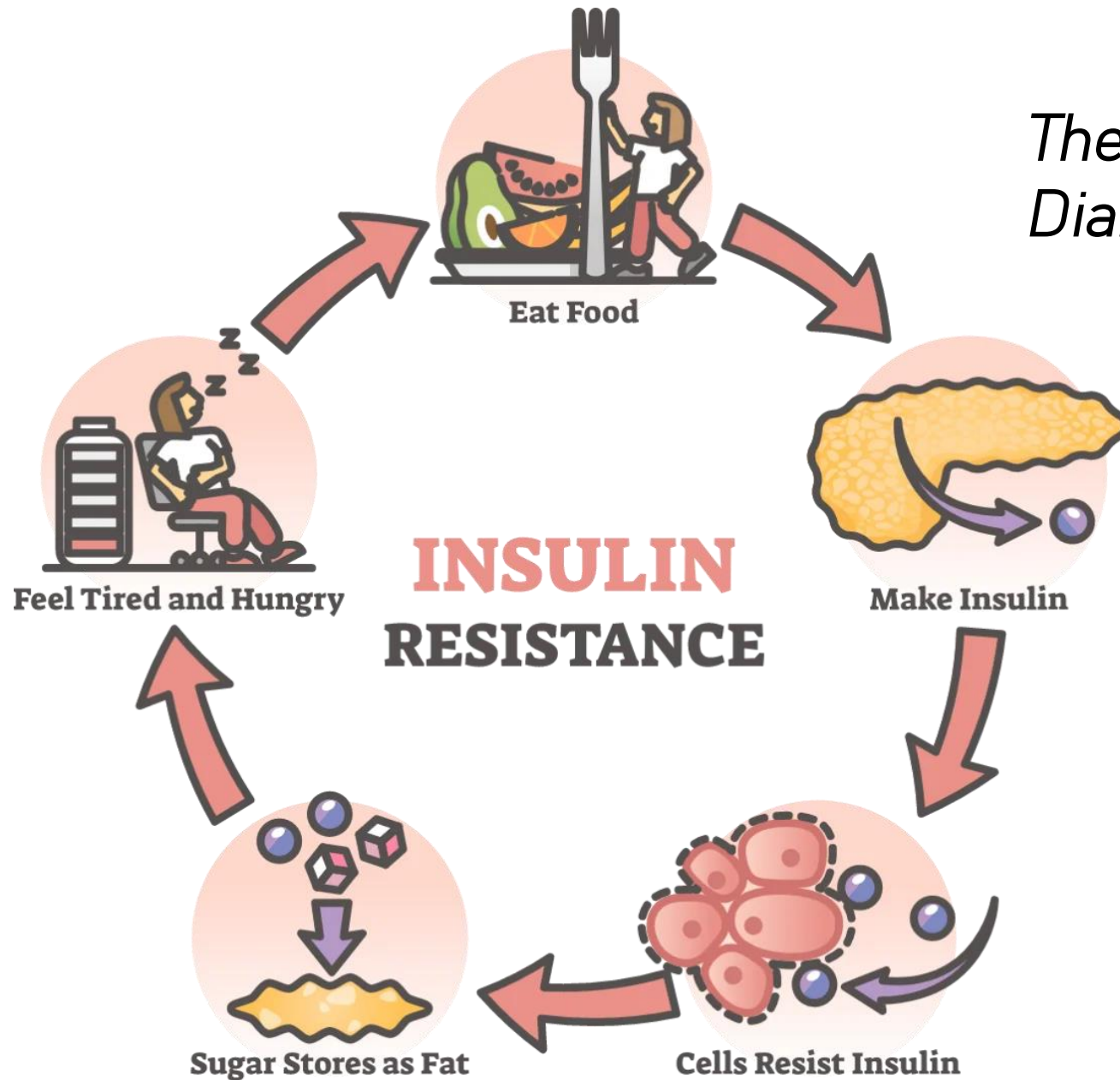
## ADA 2024 Diagnostic Criteria: Normal vs Prediabetes vs Diabetes

	Normal	Prediabetes	Diabetes
Fasting Blood Glucose (FBC)	<100 mg/dl	100–125 mg/dl	≥126 mg/dl
Oral Glucose Tolerance Test	<140 mg/dl	140–199 mg/dl	≥200 mg/dl
HbA1c	<5.7%	5.7 – 6.4%	≥6.5%

👉 Follow @The Nursing Mind on  
YouTube, Instagram & Facebook



The main problem with Type 2 Diabetes is **Insulin insensitivity**



# Risk factors for Type 2 Diabetes

## MODIFIABLE RISK FACTORS



Overweight/obese



Physical inactivity



Poor dietary habits



Hypertension



Smoking



Certain medications  
e.g. glucocorticoids

## NON-MODIFIABLE RISK FACTORS



Genetics



Family history



Race/ethnicity



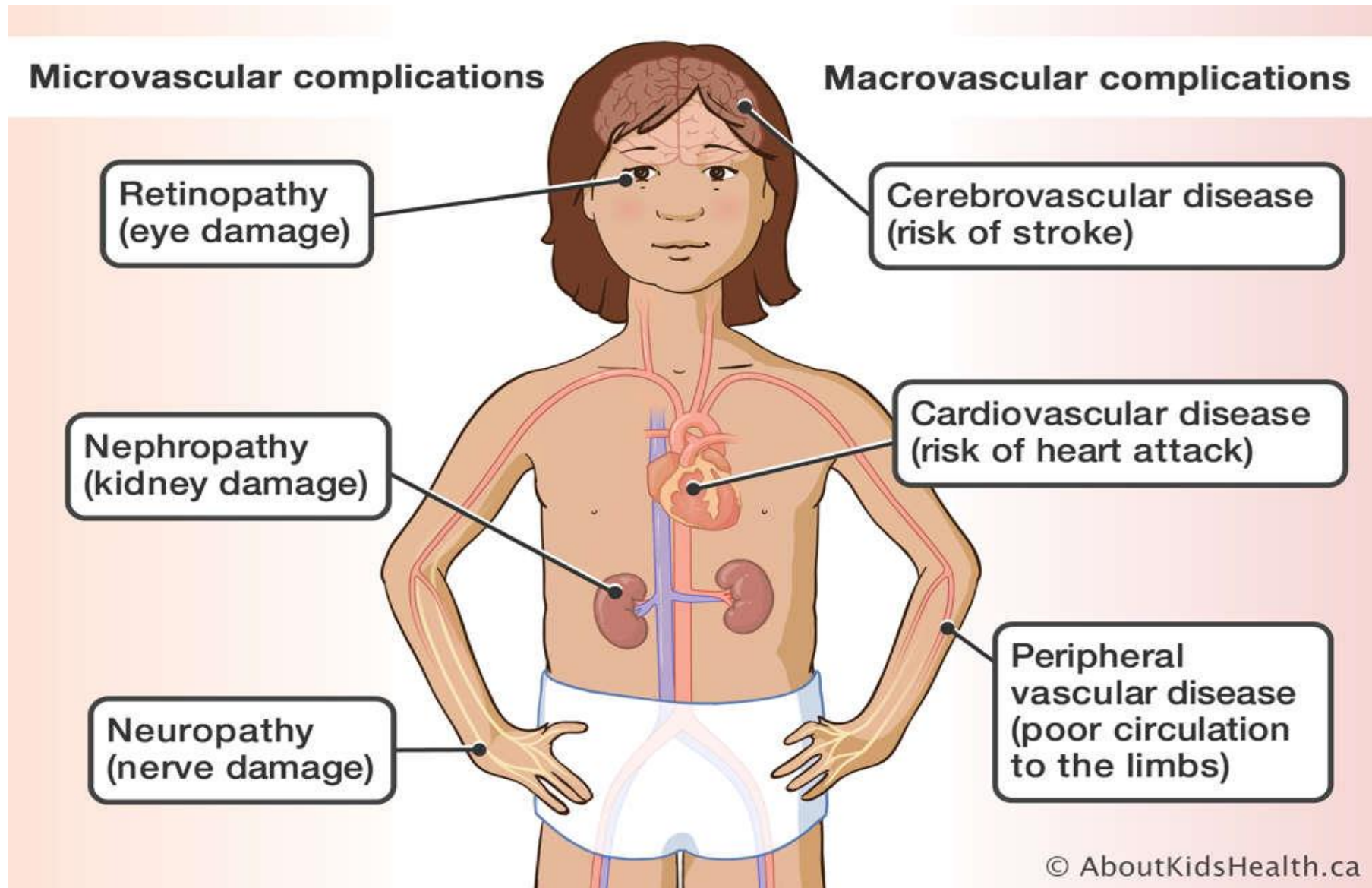
Increasing age (>45)



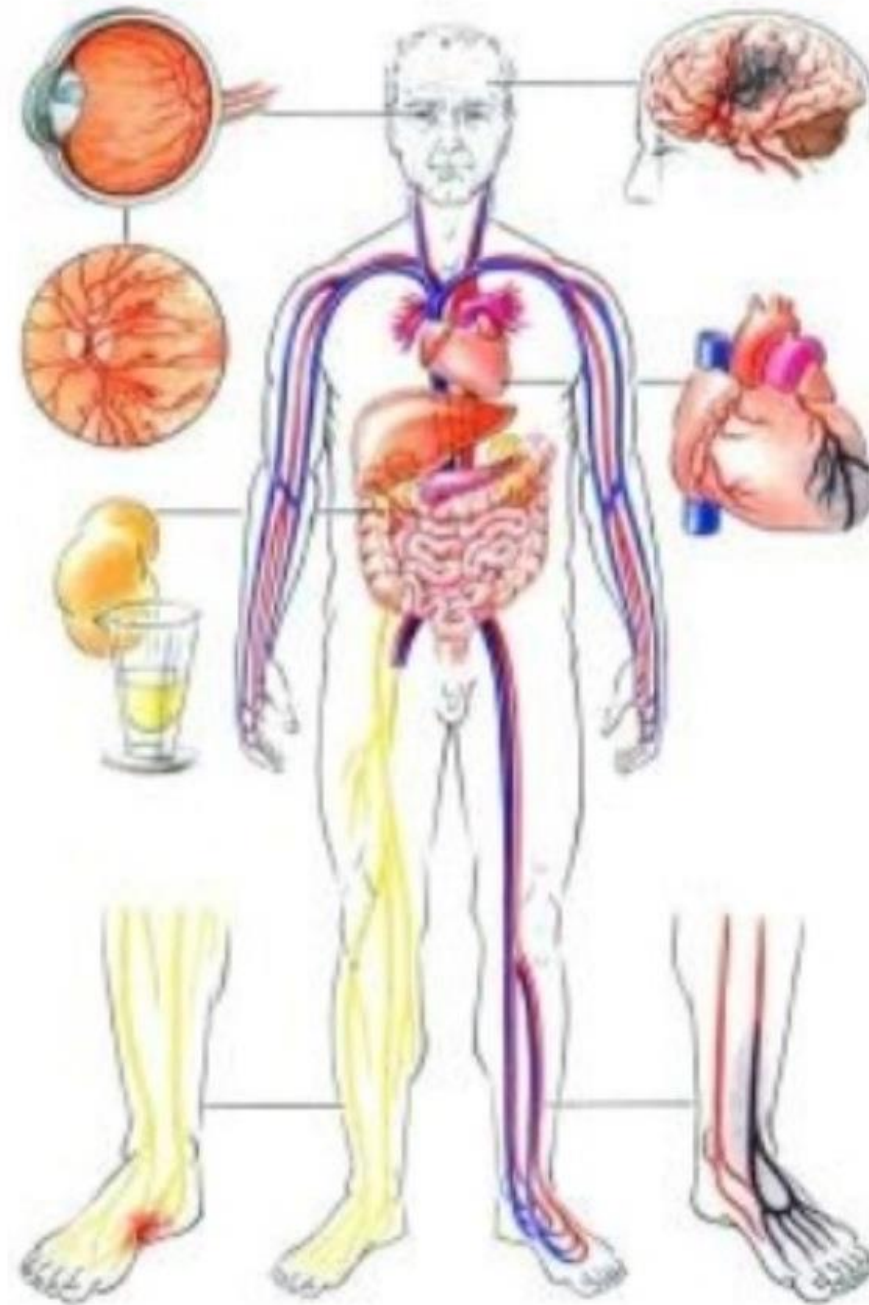
History of gestational  
diabetes

TYPE 2  
DIABETES

# Complications of Diabetes



# *Taking control*



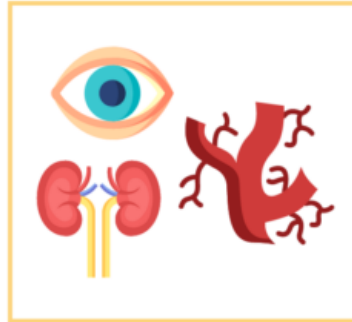
---

A DECISION FOR YOU  
AND YOUR DOCTOR

For every 1% reduction in HbA1c,  
you can reduce the risk of:



Mortality  
caused by  
diabetes



Microvascular  
complications

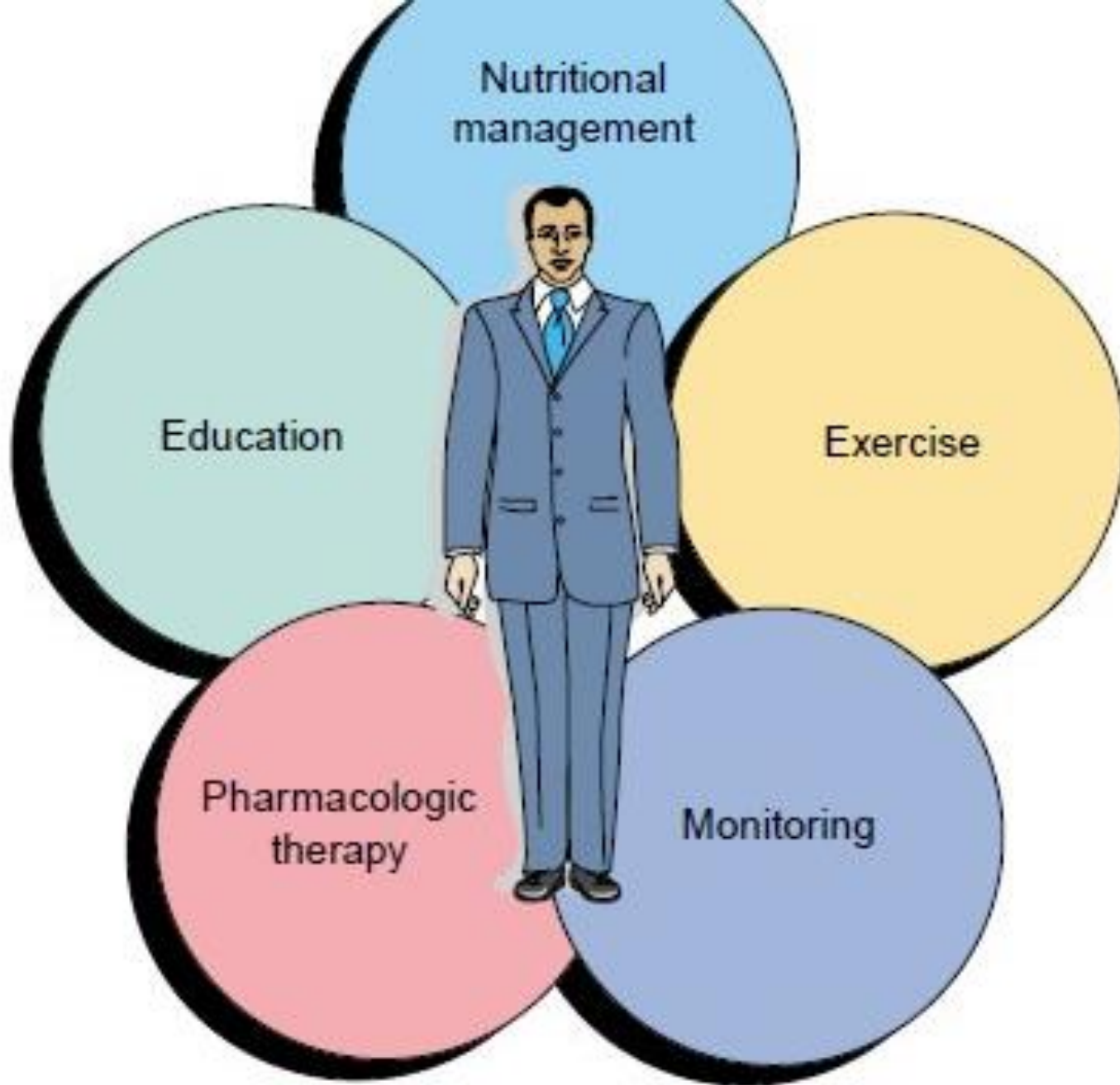


Amputation in  
peripheral artery  
disease



Keeping your HbA1c value below 7% can greatly reduce  
the risk of diabetes-related complications.

# Benefits of reducing glucose levels



# The 5 components of Diabetes management

---

**FIGURE 41-2** The five components of diabetes management.

# Nutritional Management

---

# 12 Foods That Lower the Risk of Diabetes

- Fatty fish
- Leafy Greens
- Avocados
- Nuts
- Extra Virgin Olive Oil
- Garlic
- Berries
- Broccoli
- Legumes
- Oatmeal
- Greek Yogurt
- Shirataki Noodles



**CHOOSE  
MORE OFTEN** ✓

# DIABETIC EATING PLATE

**✗ CHOOSE  
LESS OFTEN**



HEALTHY FATS



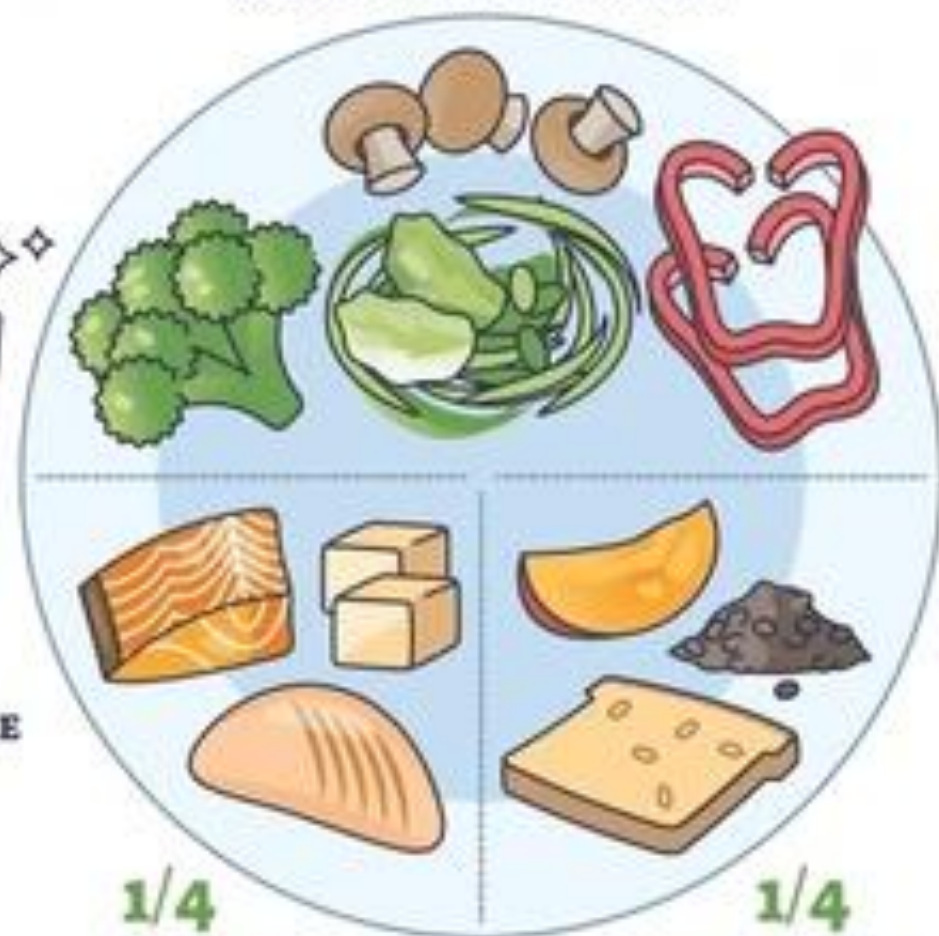
FRUITS



DAIRY



WATER OR  
ZERO-CALORIE  
DRINK



1/2

NON-STARCHY VEGETABLES

1/4

LEAN PROTEIN

1/4

COMPLEX CARBS



SWEETS AND SUGARY  
DRINKS



REFINED CARBS



PROCESSED MEATS  
AND FRIED FOODS

# Know what a portion of particular foods are

---

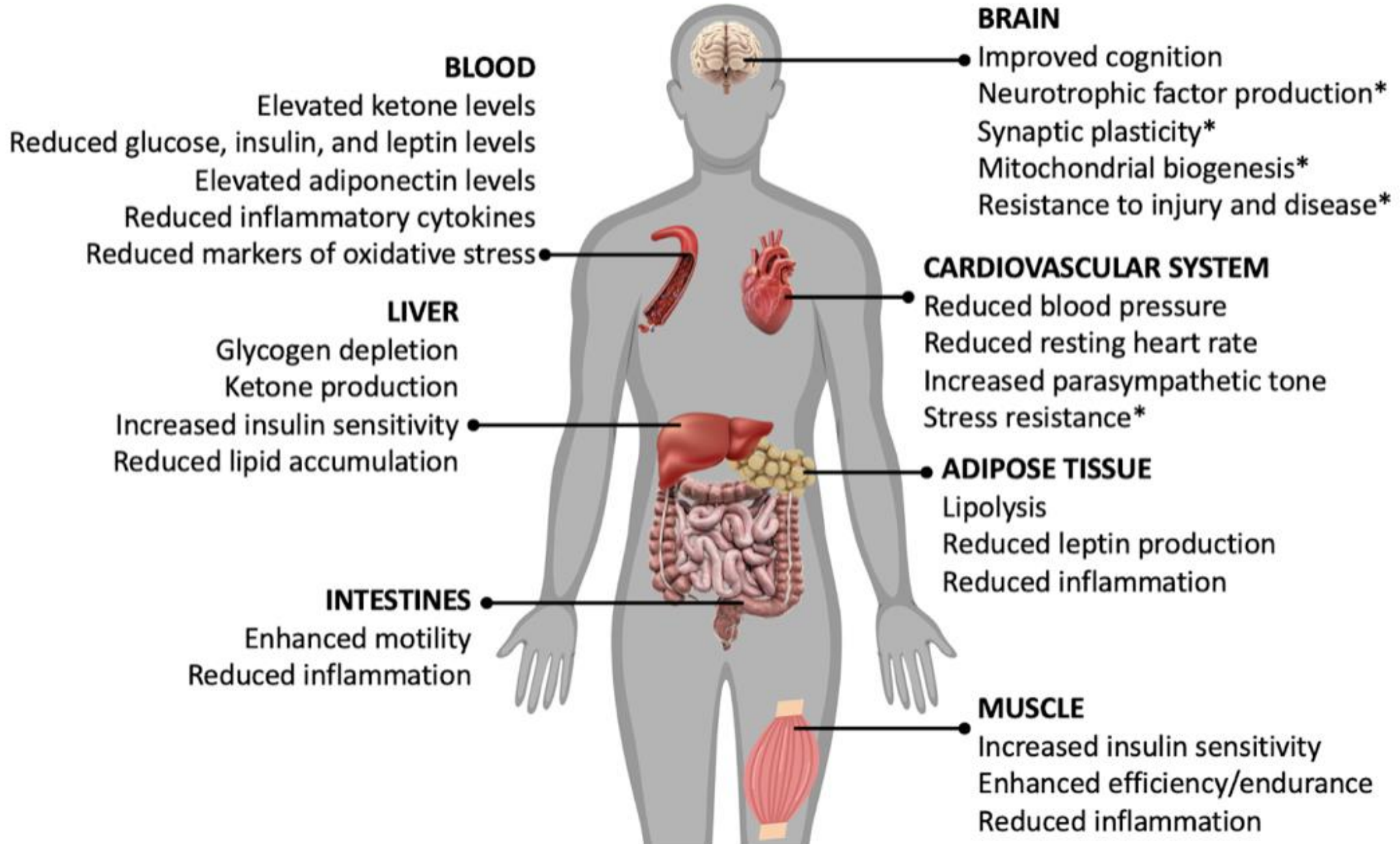
## FOOD PORTIONS

- ❑ Meats (Beef, Pork, Chicken, Turkey) and Fish: 3 ounces
- ❑ Bread: 1 slice, about the size of your flat hand.
- ❑ Cooked Rice, Pasta, or Oatmeal: the size of a tennis ball.
- ❑ Ready-To-Eat Dry Cereal: 1 cup,
- ❑ Raw, Cooked, or Canned Vegetables/Fruits: 1 cup
- ❑ Leafy Salad Greens: 2 cups,
- ❑ Milk or Yogurt: 1 cup,
- ❑ Cheese: 1.5 ounces,, roughly the size of a pair of dice.

Intermittent fasting is helpful if one's medical situation allows that.

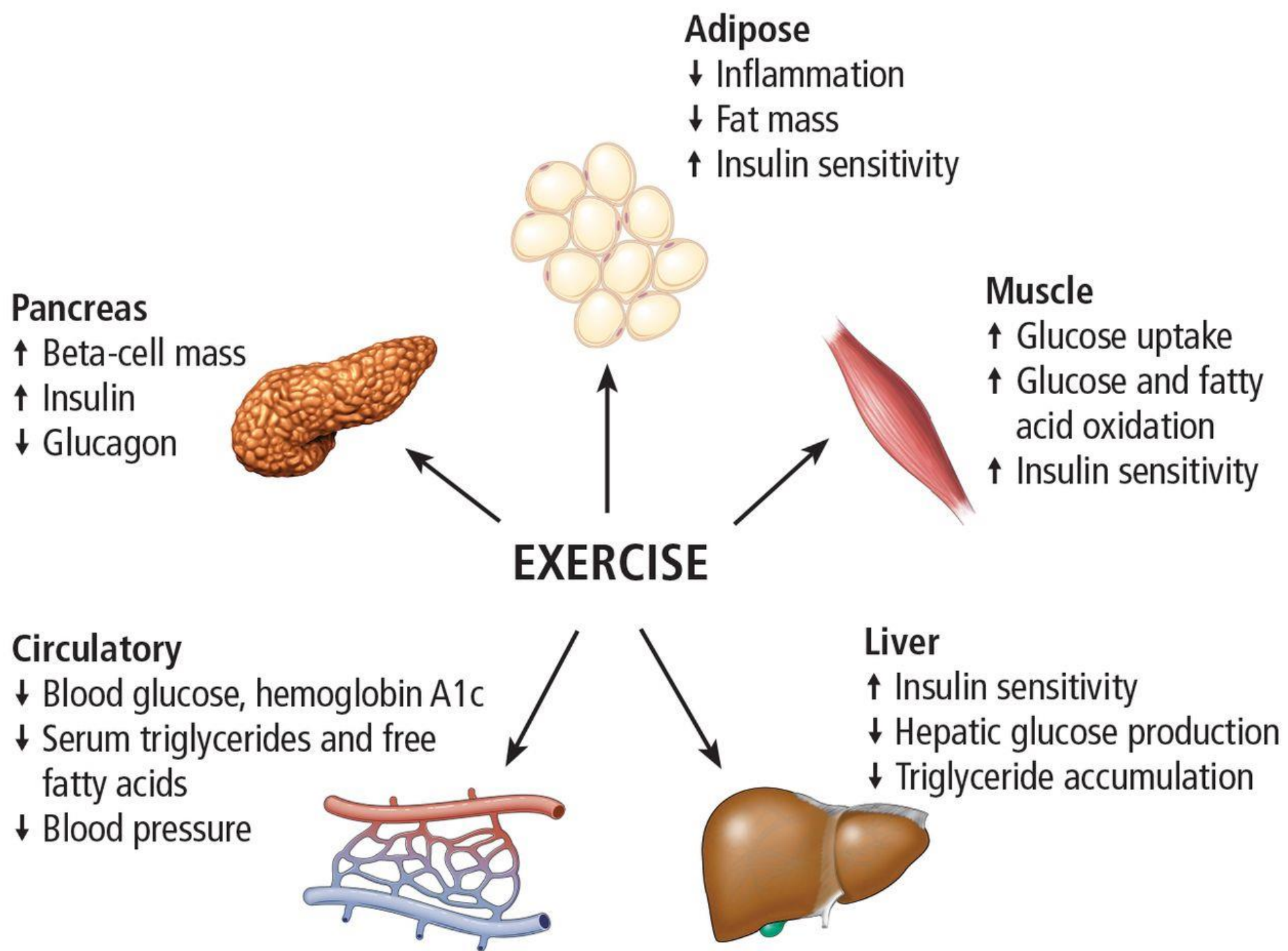


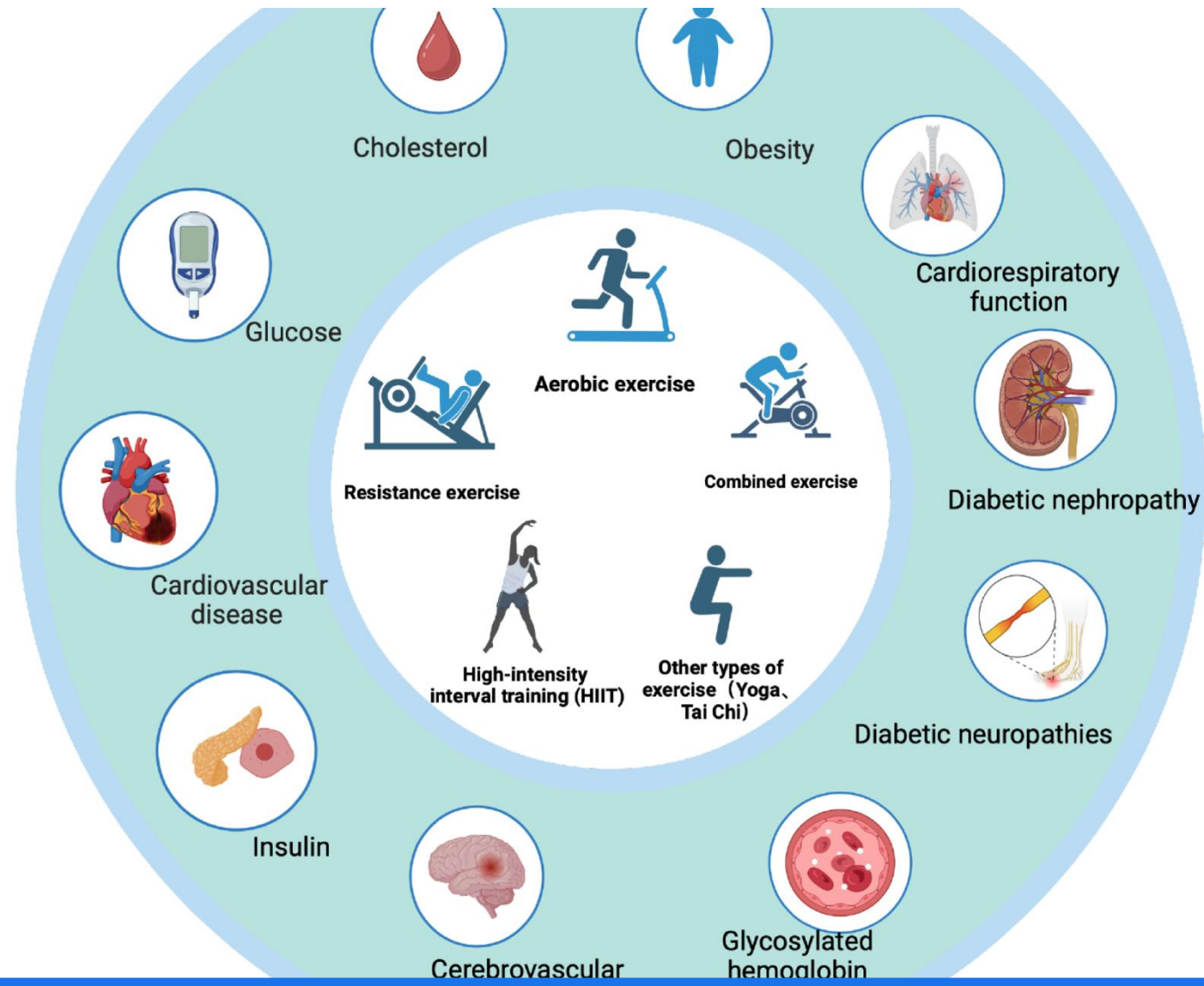
# Physiological Effects of Fasting



# Exercise

---





- **Aerobic Exercise:** Aim for at least 150 minutes of moderate-intensity aerobic activity per week
- **Strength Training:** Add resistance exercises (like light lifting or bodyweight movements) at least two days a week.

---

# Before prescribing significant exercise regimen

- A **thorough physical examination** and careful medical tests, including documentation of the grade of retinopathy, nephropathy, and neuropathy (both peripheral and autonomic)
- A previously sedentary patient should start activities slowly
- Older patients, patients with long-standing disease, patients with multiple risk factors, and patients with previous evidence of atherosclerotic disease should have **a cardiovascular evaluation**, probably including an imaging study, prior to beginning a significant exercise regimen
- **Doppler ultrasonography and an ankle-brachial index test** should be performed if there is evidence of peripheral arterial disease
- May have to limit weight-bearing exercises for those with sensitive feet

---

# Basic Tips

- A **warm-up and cool-down session** of 5-10 minutes must always be undertaken
- Comfortable footwear: The individual should use silica gel or air insoles, and socks, to prevent blisters and maintain circulation
- The patient should examine his or her feet prior to and after physical exercise
- A diabetic bracelet should be worn, and steps should be taken to ensure its visibility
- An average of 17 oz of fluids should be consumed at least 2 hours prior to the start of exercise in order to maintain adequate hydration

# Drug Therapy

---

# Diabetes Control Chart

Excellent

Good

Poor

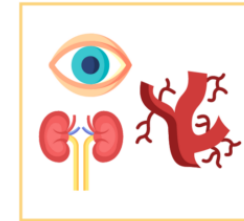
HbA <sub>1c</sub> test Score	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0	14.0
MEAN BLOOD mg/dL	50	80	115	150	180	215	250	280	315	350	380
GLUCOSE mmol/L	2.6	4.7	6.3	8.2	10.0	11.9	13.7	15.6	17.4	19.3	21.1



For every 1% reduction in HbA<sub>1c</sub>, you can reduce the risk of:



Mortality caused by diabetes



Microvascular complications



Amputation in peripheral artery disease



Keeping your HbA<sub>1c</sub> value below 7% can greatly reduce the risk of diabetes-related complications.

*It is important to keep your glucose under control*

---

## Some drugs have additional heart and kidney benefits aside from lowering the blood glucose or BP

- Medications that end with –pril or tan, eg. Lisinopril, ramipril, Losartan, Valsartan
- Medications that end with liptin eg Vildagliptin, Linagliptin,
- Medications that end with gliflozin. Eg. Empagliflozin, dapagliflozin

# Education and Monitoring

---



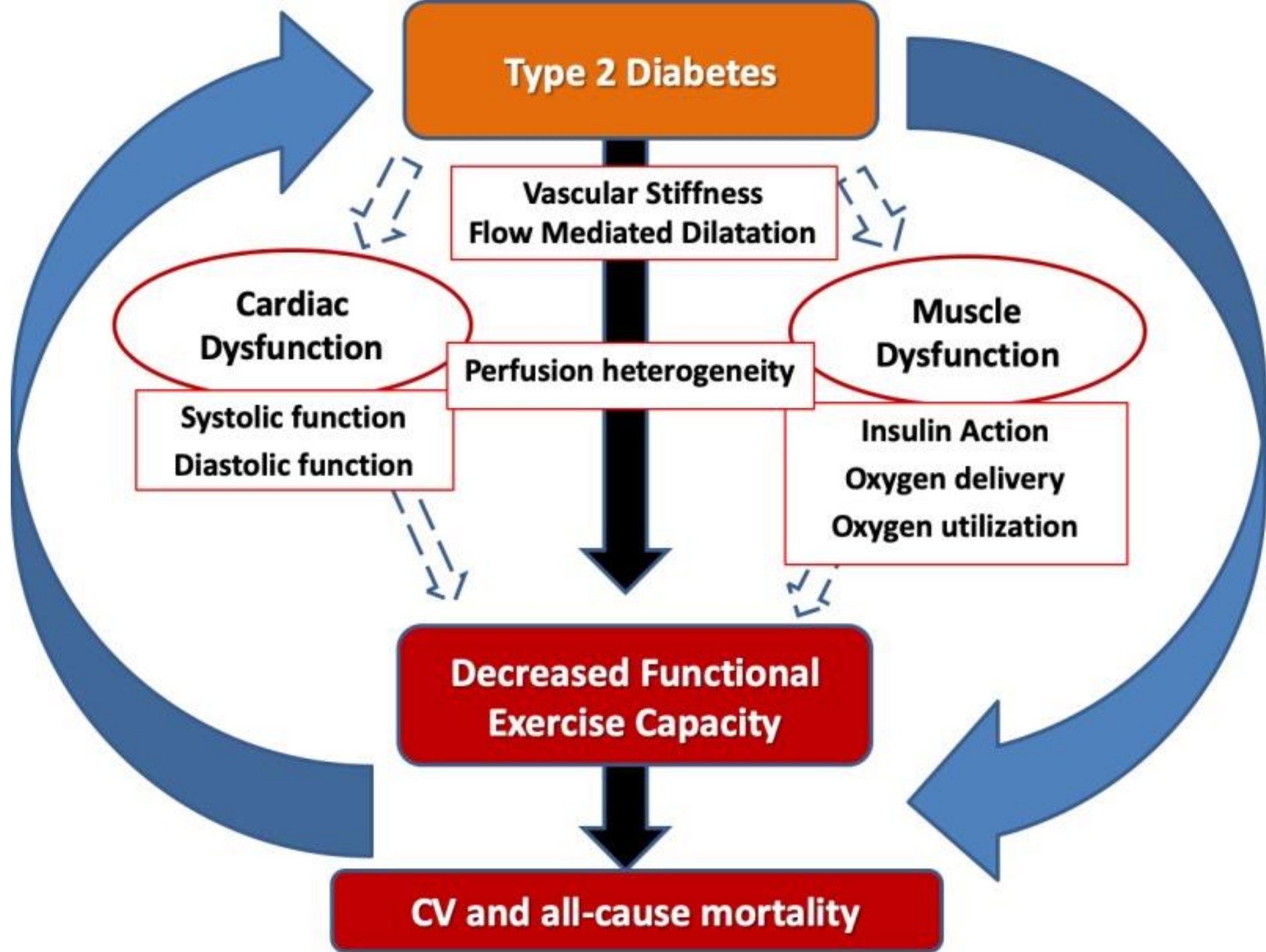
# In Summary, overcoming Diabetes and Hypertension means

- **Weight Loss:** Losing 5% to 7% of your body weight can lower diabetes risk by nearly 60%
- **Exercise:** Aim for  $\geq 150$  minutes of moderate-intensity activity weekly (like brisk walking), combined with resistance training. Breaking up long periods of sitting is also recommended.
- **Dietary Adjustments:** Focus on high-fiber foods and limiting red/processed meats.
- **Sleep Management:** Aim for about 7 hours of sleep nightly; getting less than six or more than nine hours can increase diabetes risk by up to 50%
- **Pharmacotherapy:** If lifestyle changes are not sufficient, Metformin is the first-line medication option for high-risk individuals.

# Thank you.



QUESTIONS?



**Type 2 Diabetes**

**Vascular Stiffness**  
**Flow Mediated Dilatation**

**Cardiac  
Dysfunction**

**Muscle  
Dysfunction**

**Perfusion heterogeneity**

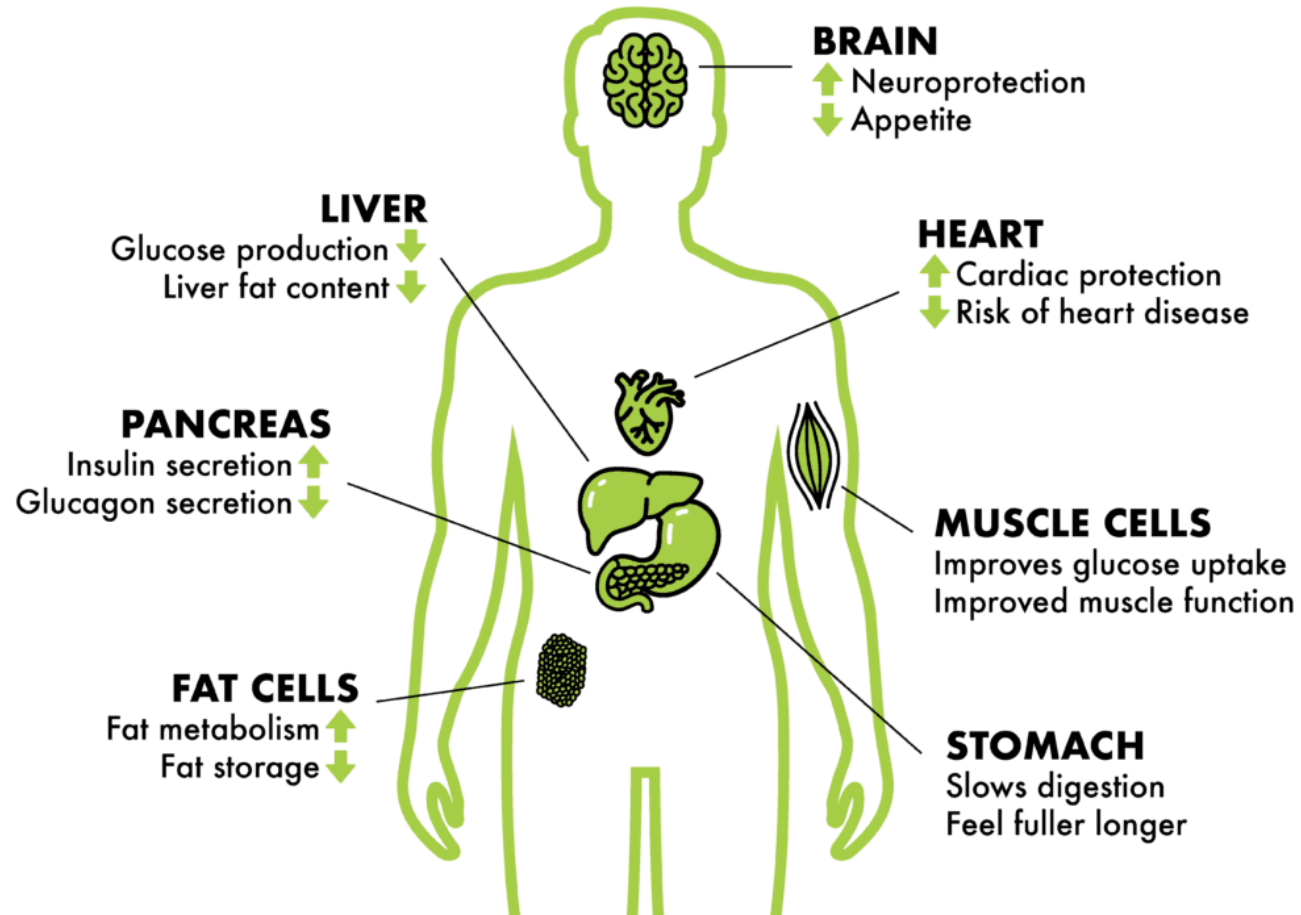
**Systolic function**  
**Diastolic function**

**Insulin Action**  
**Oxygen delivery**  
**Oxygen utilization**

**Decreased Functional  
Exercise Capacity**

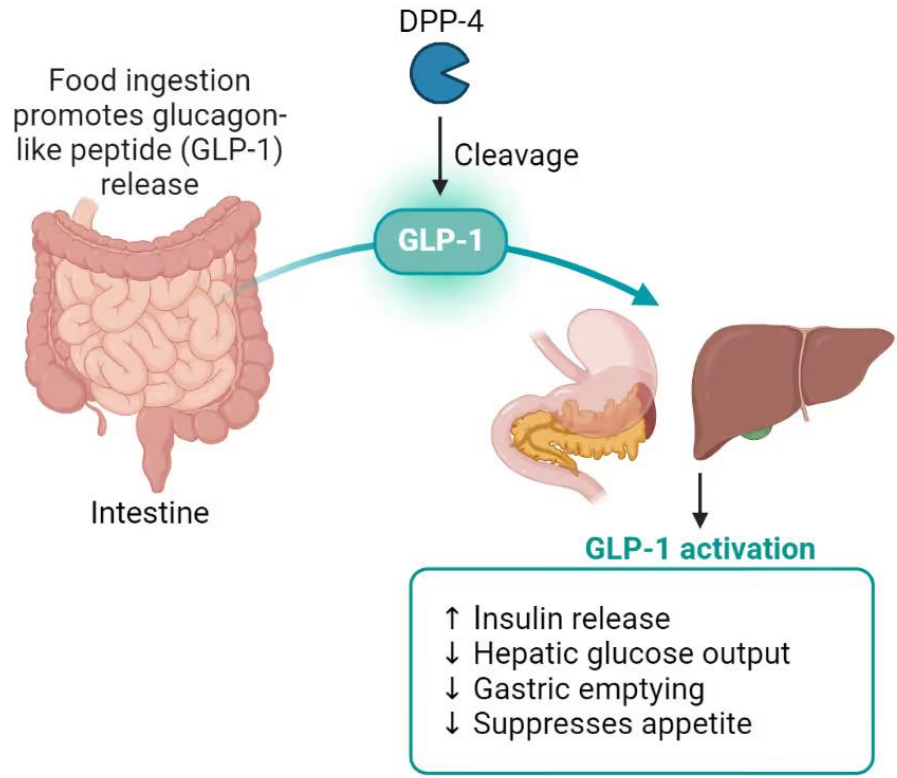
**CV and all-cause mortality**

## THE POTENTIAL BENEFITS OF GLP-1 THERAPY

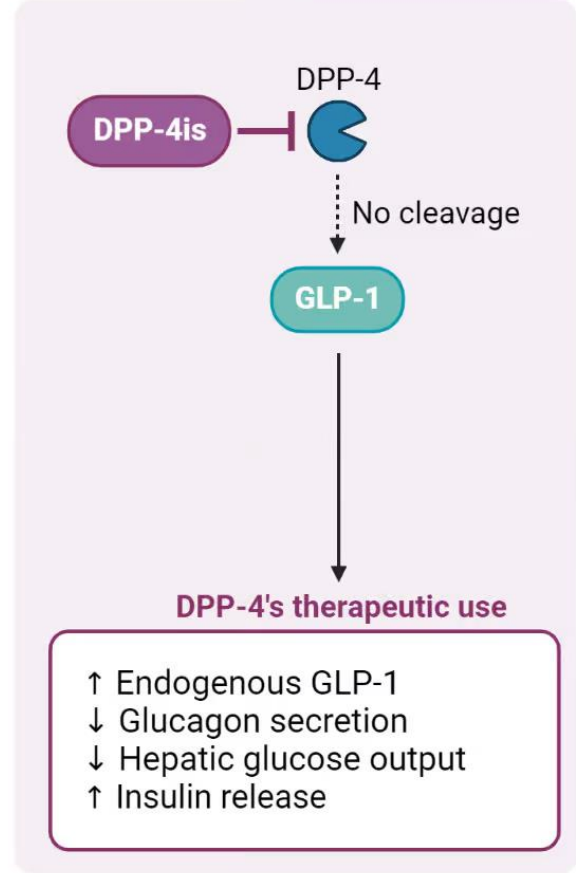


The issue with GLP-1 RA in DM control is cost

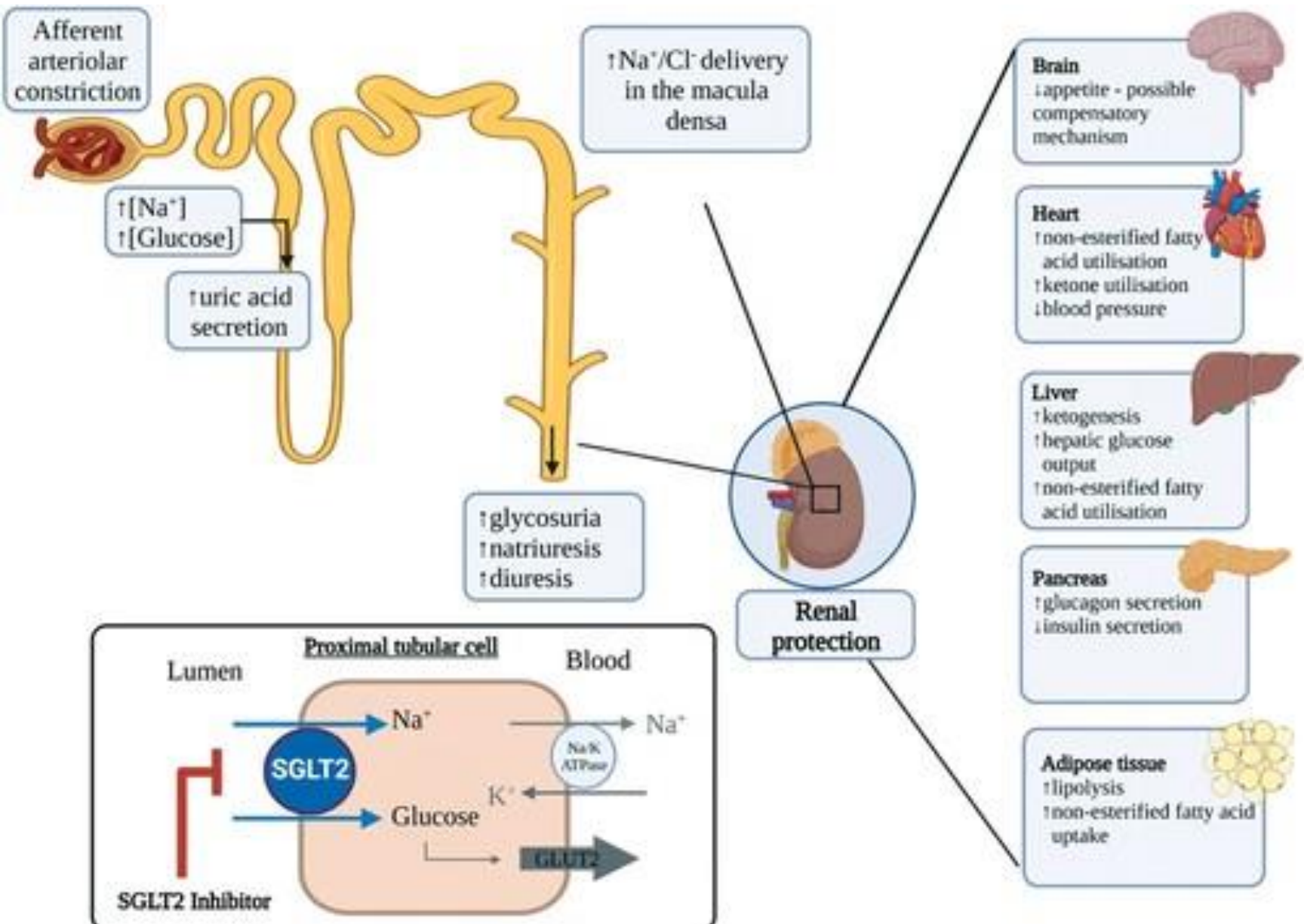
### GLP-1 agonists



### DPP-4 inhibitors



DPP-4 plus metformin gets one close to a GLP-1 RA effect



Choose drugs with multiple benefits