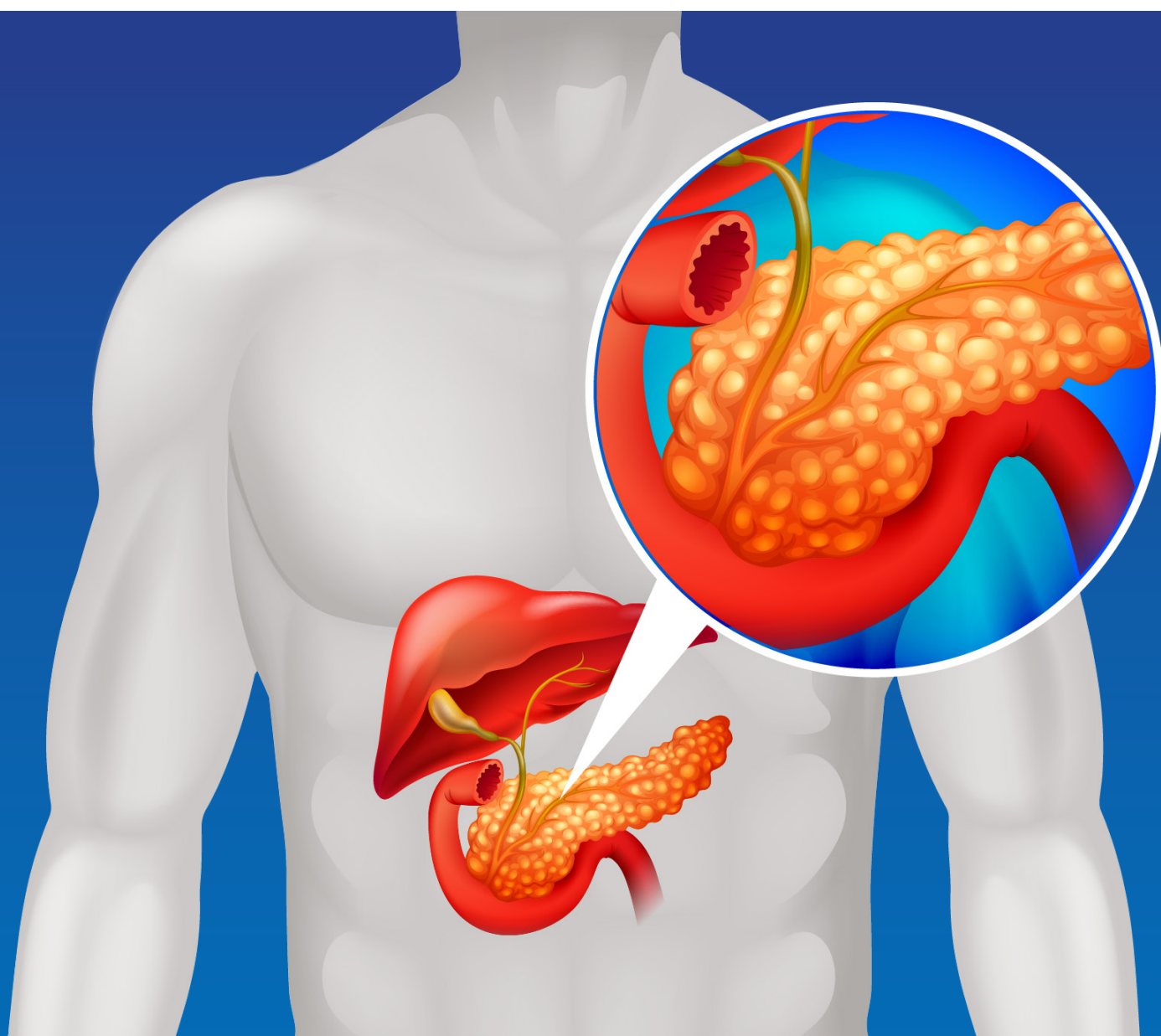


# AMD Foundation Project



## TYPE 2 DIABETES MELLITUS



Multilingual manual

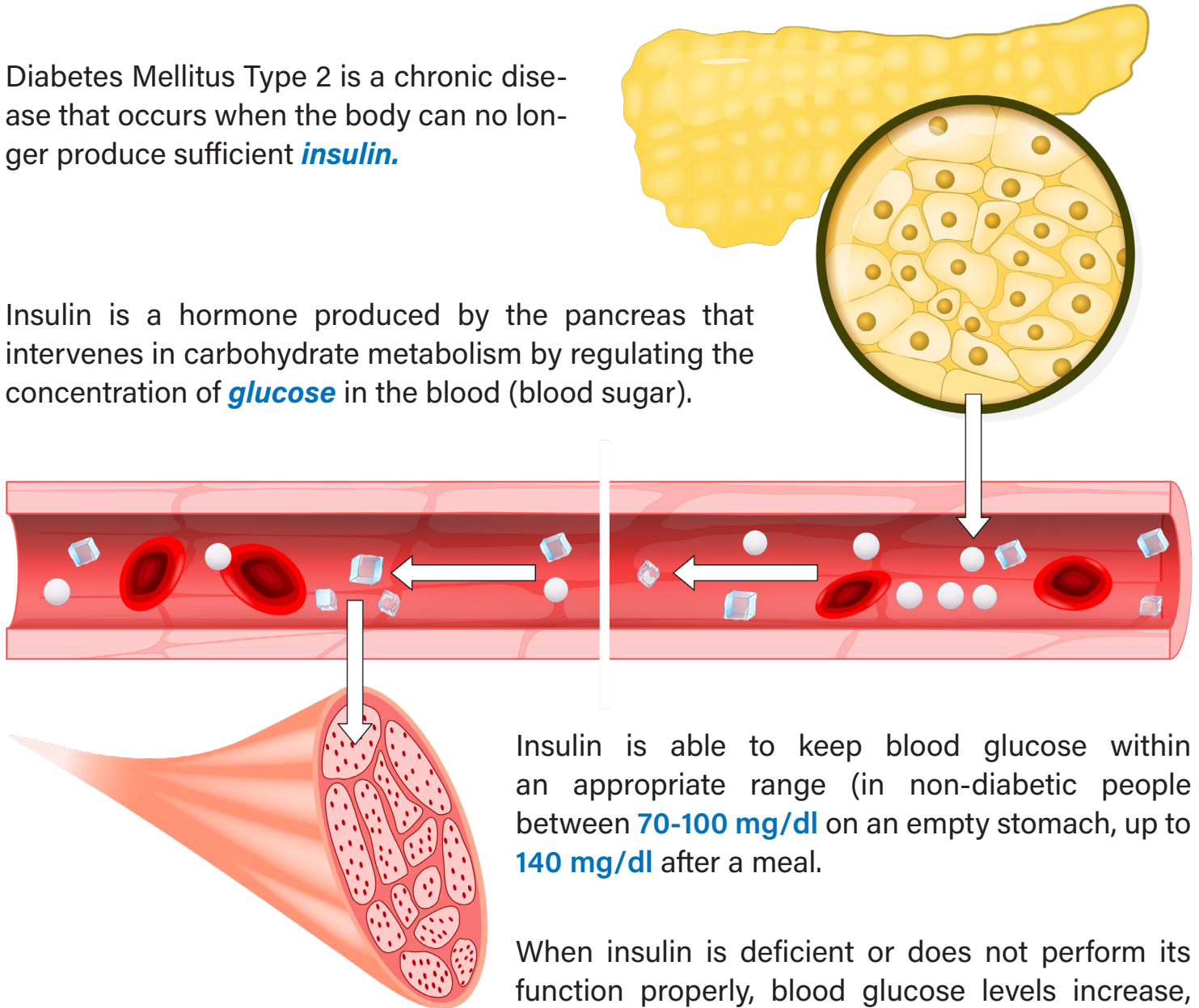
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# What is Diabetes

## Diabetes Mellitus Type 2

Diabetes Mellitus Type 2 is a chronic disease that occurs when the body can no longer produce sufficient **insulin**.

Insulin is a hormone produced by the pancreas that intervenes in carbohydrate metabolism by regulating the concentration of **glucose** in the blood (blood sugar).



Insulin is able to keep blood glucose within an appropriate range (in non-diabetic people between **70-100 mg/dl** on an empty stomach, up to **140 mg/dl** after a meal).

When insulin is deficient or does not perform its function properly, blood glucose levels increase, leading to a hyperglycaemic condition (increased blood glucose).

This is why the diagnosis of diabetes mellitus is made by measuring blood sugar.

## How the diagnosis is made

In the absence of typical symptoms (see later), the diagnosis of diabetes is confirmed if, on at least 2 different occasions, we find the following measurement values:

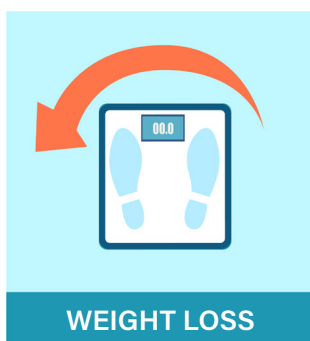
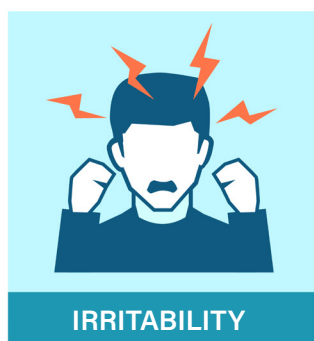
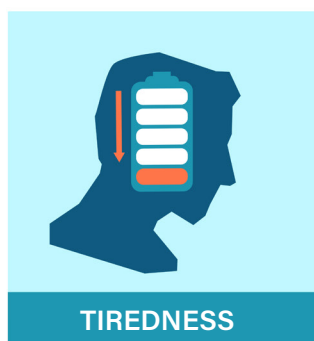
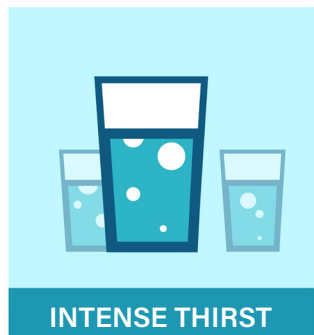
- **Fasting blood glucose > 126 mg/dl**
- **Blood glucose > 200 mg/dl two hours after Oral Glucose Tolerance Test** (carried out with 75 g)
- **Glycated haemoglobin > 48 mmol/mol** (6.5%)



## Symptoms of Diabetes

The symptoms of diabetes are related to hyperglycaemia and the loss of glucose with urine, which occurs when blood glucose values exceed a threshold of around **180-200 mg/dl**. The main symptoms of diabetes mellitus are:

# Symptoms of Diabetes



## Types of Diabetes

There are different types of diabetes, the main ones being:

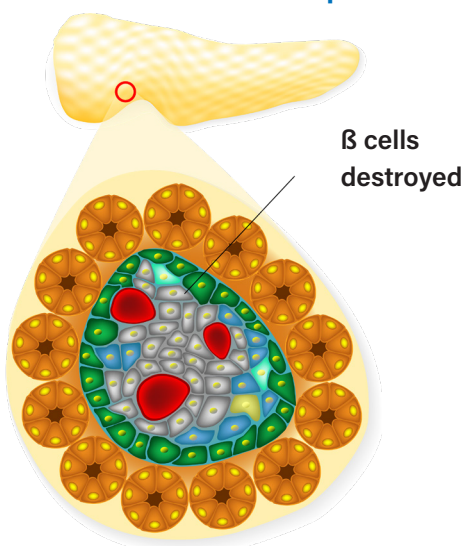
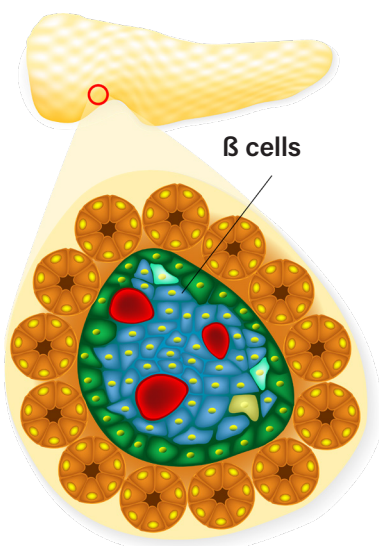
- **Type 1 Diabetes**, caused by the lack of insulin because the cells that produce it and called  $\beta$ -cells (found in the pancreas within isolated groups of cells that collectively are called the Islets of Langerhans), are destroyed by autoimmune mechanisms. It usually occurs in younger people, in about 10% of all diabetics.

The therapy is insulin alone.

### The Islets of Langerhans

Pancreas sano

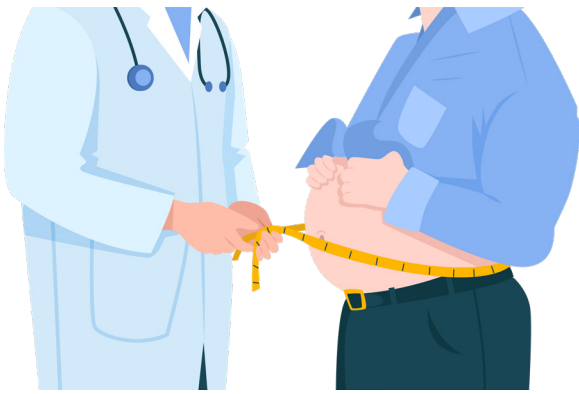
Diabete Mellito di Tipo 1



### Insulin

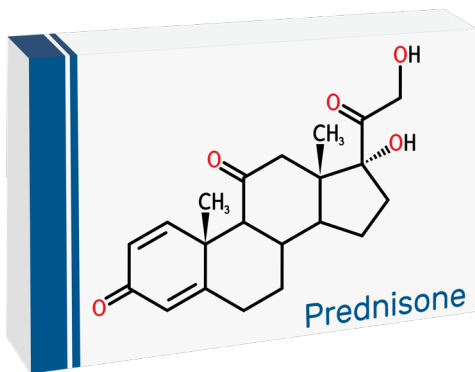
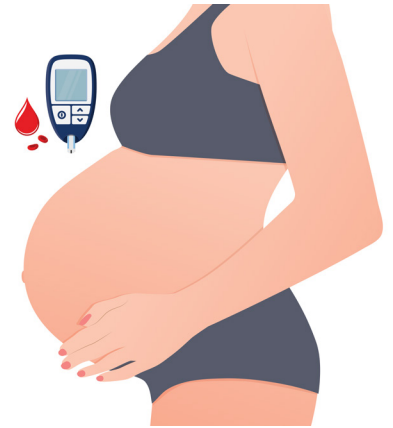






- **Type 2 diabetes**, is caused by a combination of factors resulting in ineffective insulin action (insulin resistance), which is still produced, but in reduced quantities. It usually arises in adults who are overweight or obese. It accounts for about 90% of individuals with diabetes.

- **Gestational Diabetes**, which arises during pregnancy, It usually disappears after delivery, but represents a risk factor for type 2 diabetes in subsequent years.



- **Meta-steroid diabetes**, which can occur in people taking high doses of cortisone and for long periods of time.

## Complications of Diabetes

### *Type 2 diabetes is a treatable disease, but what happens if it is not managed well?*

Individuals with Type 2 diabetes are particularly susceptible to complications resulting from high glucose levels, and since Type 2 diabetes may have set in well before its diagnosis, complications may already be serious or advanced by the time they are discovered.

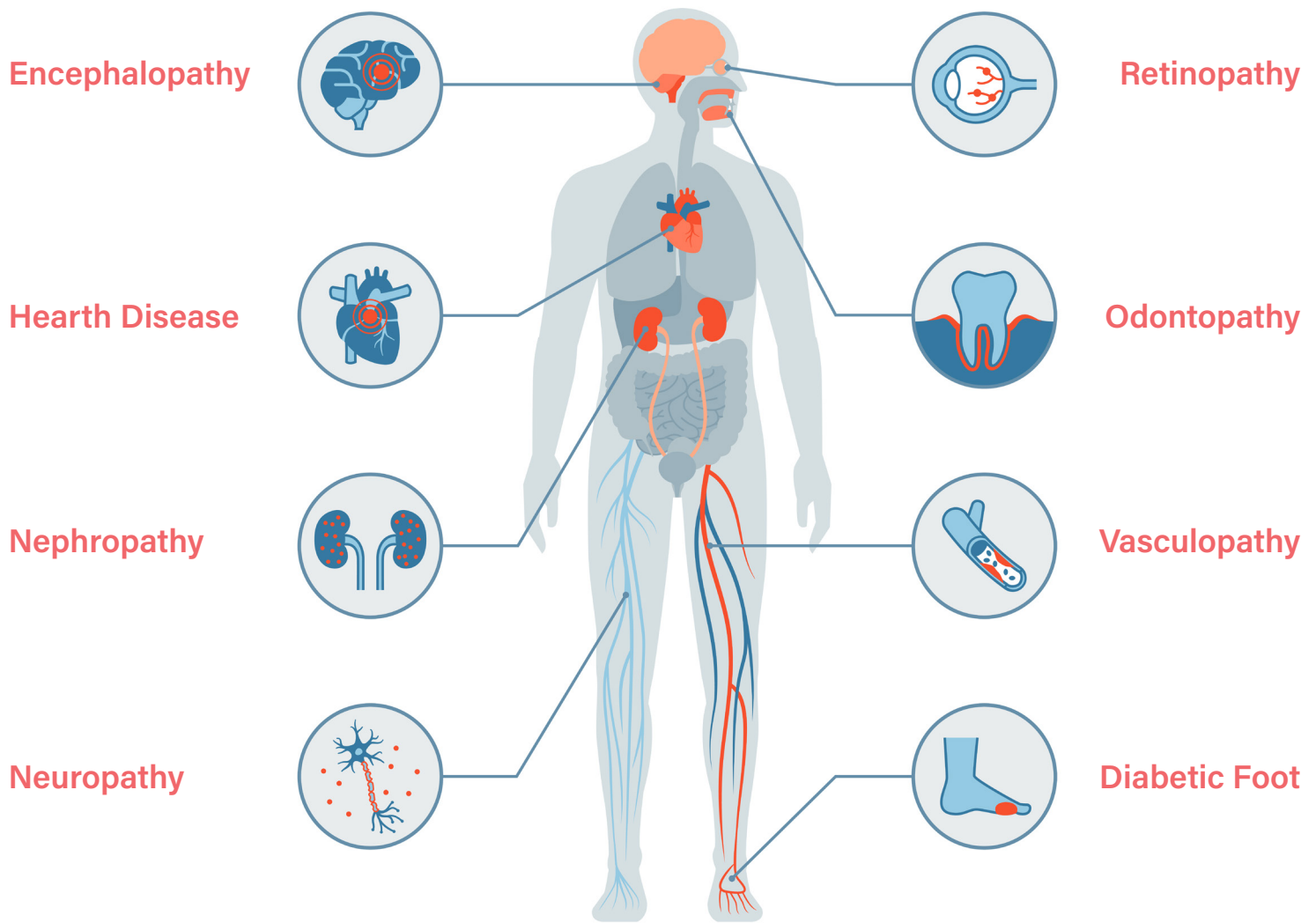
*Individuals with Diabetes Mellitus may experience various complications in both the short and long term.*



Some of these begin a few months after the onset of diabetes, although most tend to develop after a few years. Most of these complications worsen gradually.

In individuals with diabetes, the greater the ability to control blood glucose levels, the less likely it is that these complications will develop or worsen.

*The most important complication of Diabetes are:*



## Glycaemic self-monitoring

Blood glucose self-monitoring allows blood glucose levels to be measured and is a treatment tool and an integral part of therapy. It consists of monitoring capillary blood glucose in a manner, frequency and timing agreed with the care team.

The aim is to have the information needed to

- *modify incorrect behaviour*
- *choose the type of medication and dose*
- *assess its efficacy and safety in relation to the risk of hypoglycaemia*



There are numerous factors influencing glycaemic levels, in particular we recall:

- *dietary intake of carbohydrates*
- *the duration and type of exercise practised*
- *the drug therapy taken*
- *very intense emotional stress*



To perform home glycaemic self-monitoring, you need:

- *the glucometer*
- *the test strip*
- *the lancing device and lancet*

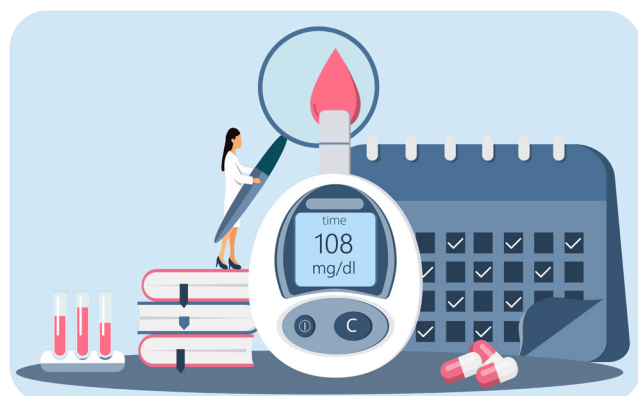


The **test strips** are specific to each glucose meter, so you should always make sure that the type of strip you are using is compatible with the type of glucose meter you are using.

The **lancing device** is a small pen on which a disposable lancet is mounted, which is necessary for **taking capillary blood samples**.

## How to perform blood glucose self-monitoring

Your **diabetologist** will tell you how often to perform blood glucose self-monitoring and at what times of day to do it. In general, glycaemic control is indicated:



**On an empty stomach and before meals** in people who are on **insulin therapy** to establish the units of insulin to be administered at mealtimes

**On an empty stomach and after meals** in people using **insulin or oral medication**.

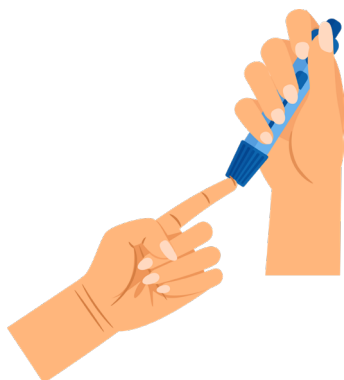
## What needs to be done to perform a proper self-check?

To answer this question, just follow the instructions below precisely.



**Wash your hands** with warm or hot water and soap, then dry them well. It is not necessary to use disinfectant.

**Place the strip** inside the glucose meter making it turn on.



**Take the lancing device** and place it perpendicular to the fingertip. Use the lateral areas of the fingertips, which are less sensitive and cause less pain.

**DO NOT apply strong pressure** to the base of the finger on which the lancing device was used in order to allow a drop of blood to come out. Press gently as very very little is needed.



**Bring the strip** sticking out of the glucose meter closer to the drop of blood being drawn.

**Place** the glucose meter **on a flat surface** and after a few seconds you will be able to see the blood glucose value on the screen.



It is recommended to take care of the device and all the material needed to check blood glucose, avoid getting it dirty and store the strips well, this will ensure that you always have reliable values

The optimal use of glucose meters requires adequate data analysis skills.

Patients and caregivers must be instructed on how to use the data to modify:

• **nutrition**

• **exercise**

• **medication therapy**



and to achieve glycaemic goals.



What are the glycaemic targets

On an empty stomach and before meals: **70-130 mg/dl**

2 hours after meals: **less than 160 mg/dl**

An aid to modify insulin therapy at home:

**If you find high blood glucose values before meals:**

- **increase** the insulin dose
- **check blood** glucose again after **2 hours**



**If you repeatedly find high blood glucose values 2 hours after meals** (and the values before were fine)

- **you increase the insulin dose** for that meal (according to the scheme received)
- **you increase the optimal insulin dose** also at the **following meals** (according to the scheme received)



**If you find altered blood glucose values before going to bed:**

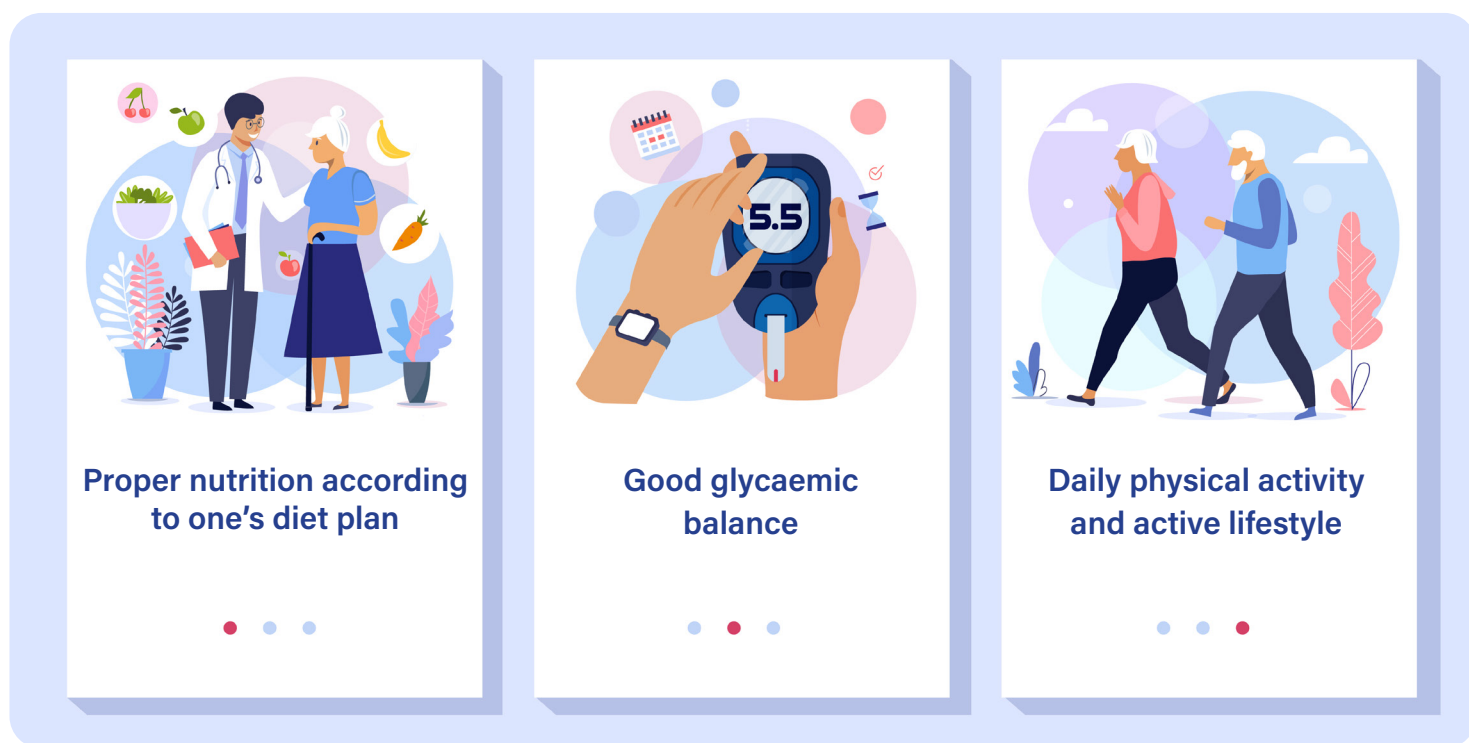
- It is not necessary to change the dosage of insulin at night.
- If blood glucose is below **160 mg/dl** before going to bed, it is nevertheless advisable to have a small snack before administering insulin





## Diet Therapy - 1

People with type 2 diabetes can manage to keep their blood sugar well controlled by first of all following a healthy lifestyle:



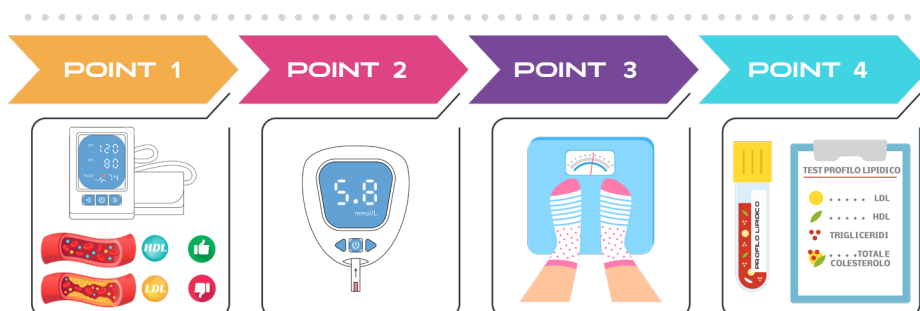
A correct diet in the person with diabetes has the following objectives: to achieve and maintain:

**1 prevention and treatment of nutrition-related risk factors or complications**

**2 good glycaemic balance**

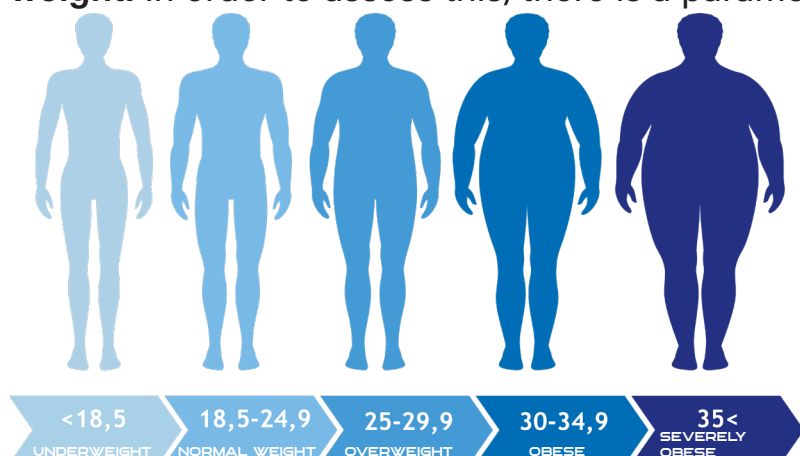
**3 weight control**

**4 a good lipid profile**



## The Body Mass Index (BMI)

For people with Type 2 Diabetes, it is particularly important to pay **attention to their body weight**. In order to assess this, there is a parameter called **Body Mass Index (BMI)**, which tells us, according to the visualisation on the side, where we stand in relation to the optimal value of the '**normal weight**' person. It is calculated using a formula that relates weight and height.



$$\text{BMI} = \frac{\text{Weight (Kg)}}{\text{Height (m}^2\text{)}}$$

## Diet Therapy - 2

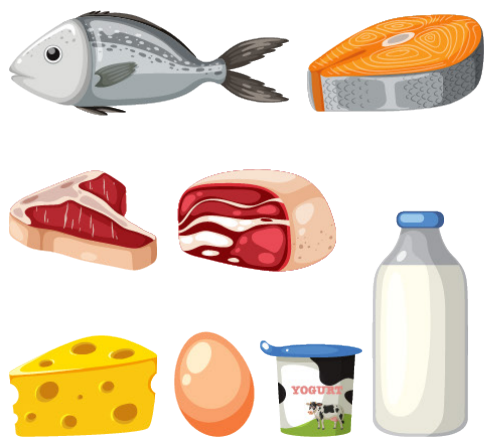
*It is important to maintain the pleasure of eating* and to exclude specific foods only when there are clinical indications or scientific evidence.

The diet of the person with type 2 diabetes must be balanced, containing all nutrients in the right proportions and rich in:

- *fiber*
- *vegetables*
- *fruit*
- *wholegrains*
- *fish*
- *olive oil*
- *meat and dairy product in moderate quantities*

## MACRONUTRIENTS

### PROTEINS



### CARBOHYDRATES



### FATS



### VEGETABLES

### FRUITS

### FIBER

### VITAMINS



The correct proportions of the various nutrients, recognised worldwide, require the following percentages of the total of each meal:

To follow is information on portion composition and frequency of food use (**Food Pyramid**) and on the composition of the single meal (**The Healthy Plate**).



# Food Pyramid

- Prefer seasonal **FRUIT** and **VEGETABLES**
- Use local products



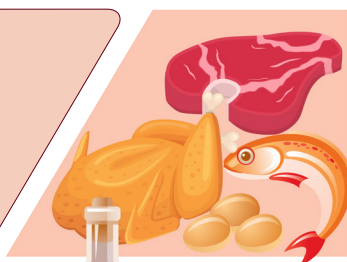
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- **SWEETENERS**  
**SNACK**  
**MERENDINES:**

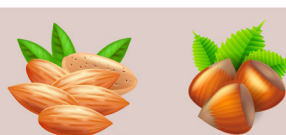
The consumption of these foods is **OCCASIONAL**

- **FISH:**  
2-3 servings/week
- **WHITE MEAT AND EGGS:**  
2-3 servings/week
- **COLD CUTS/SAUSAGES:**  
1-2 servings/week
- **RED MEAT:**  
1 serving/week



- **DAIRY PRODUCTS:**  
2-3 servings/day
- **CHEESES:**  
2 servings/week

- **EVO OIL:**  
3-4 servings/day



- **DRIED FRUIT:**  
1 serving/day

- **VEGETABLES**  
3 servings a day



- **FRUITS**  
2 serving a day



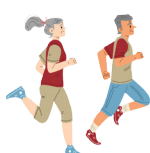
- **CEREALS AND DERIVATIVES:** 3 servings a day
- **LEGUMS** (Vegetable protein source): 3 - 4 servings a week
- **TUBERS** (Source of starch): max 2 servings a week

Water



8/10  
glasses a day

**Exercise regularly every day for at least 30 minutes**





**Each food indicated for each of the classes listed on the Food Pyramid, corresponds to 1 portion.**  
**Always stick to consuming the indicated number of servings.**

• **CEREALS AND DERIVATIVES, TUBERS AND LEGUMES:**

- **80 g of:** pasta - rice (preferably wholemeal, basmati or parboiled) - spelt - barley - sorghum - millet - quinoa
- **100 g of** fresh egg pasta      • **40 g of** breakfast cereals
- **200 g of** potatoes (max 2 servings/week)      • **100 g of** bread
- **40 g of** bakery products (rusks, biscuits, etc.)
- **150 g of:** fresh legums - frozen - soaked - canned      • **50 g of** dried pulses



• **VEGETABLES**

- **200 g of** fresh vegetables (also frozen au naturel and ready-to-eat au naturel)
- **80 g of** salad (including ready-to-eat salad)



• **FRESH FRUITS:**

- **n 1:** orange - apple - pear - peach      • **n 2:** mandarins - plums - apricots - figs
- **80 g of** banana (equivalent to 1/2 fruit)      • **80 g of** grapes      • **150 g of:** pineapple - persimmon
- **250 g of** berries (raspberries, blueberries, blackberries and currants)      • **300 g of** watermelon
- **200 g of:** strawberries - melon (equivalent to about 2 slices)



• **CHEESES, DAIRY PRODUCTS:**

- **100 g of** fresh cheeses      • **50 g of** ripened cheese
- **125 ml of** semi-skimmed milk      • **125 g of** low-fat yoghurt



• **MEAT, EGGS, FISH AND SAUSAGES:**

- **White Meat: 120 g of:** chicken - turkey - rabbit      • **n 2** eggs (about 120 g) per week
- **Red Meat: 120 g of:** beef - sheep - pork - horse - game
- **Fish: 150 g of:** fresh or frozen fish au naturel
- **Cold meats: 70 g of:** raw or cooked ham (without visible fat) roast chicken or turkey bresaola



• **DRIED FRUITS:**

- **30 g of:** almonds - walnuts - hazelnuts - etc.      • **30 g of oilseeds:** sunflower - sesame - pumpkin - etc.
- **EVO OIL: 10 g of** extra virgin olive oil (1 tablespoon)



# HEALTHY EATING PLATE

Use healthy oils (like olive and canola oil) for cooking, on salad, and at the table. Limit butter. Avoid trans fat.



The more veggies – and the greater the variety – the better. Potatoes and French fries don't count.

Eat plenty of fruits of all colors.

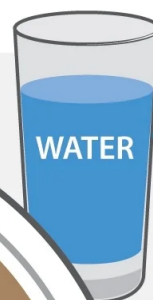


**STAY ACTIVE!**

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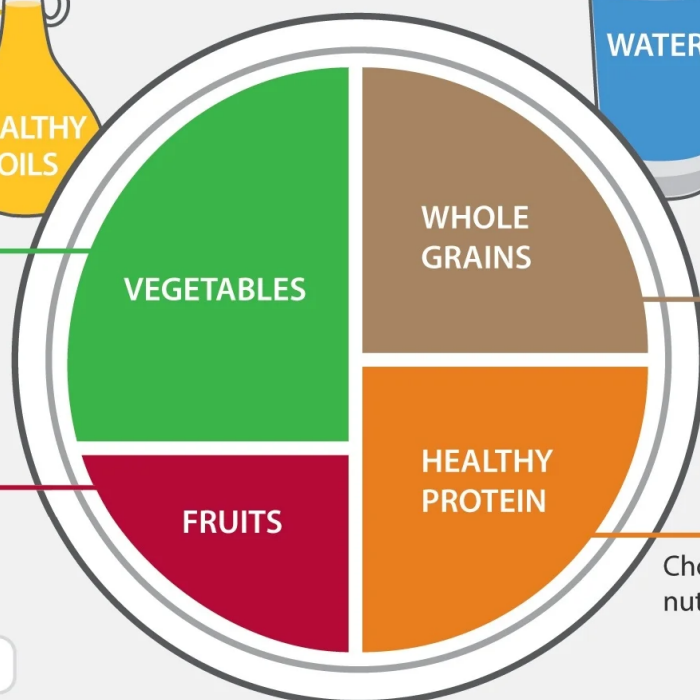
Harvard T.H. Chan School of Public Health  
The Nutrition Source  
[www.hsph.harvard.edu/nutritionsource](http://www.hsph.harvard.edu/nutritionsource)



Drink water, tea, or coffee (with little or no sugar). Limit milk/dairy (1-2 servings/day) and juice (1 small glass/day). Avoid sugary drinks.

Eat a variety of whole grains (like whole-wheat bread, whole-grain pasta, and brown rice). Limit refined grains (like white rice and white bread).

Choose fish, poultry, beans, and nuts; limit red meat and cheese; avoid bacon, cold cuts, and other processed meats.



Harvard Medical School  
Harvard Health Publications  
[www.health.harvard.edu](http://www.health.harvard.edu)

Copyright ©2011 Harvard University, For more information on the Healthy Eating Plate, please see: The Nutrition Source, Department of Nutrition, Harvard T.H. Chan School of Public Health, <http://www.thenutritionsource.org> e Harvard Health Publications, [health.harvard.edu](http://health.harvard.edu)."

The Healthy Eating Plate, created by nutrition experts from the Harvard T.H. Chan School of Public Health and the publishers of Harvard Health Publications, is a guide to creating healthy, balanced meals, whether served on a plate or packed in a lunchbox. Hang a copy on your fridge as a daily reminder to create healthy, balanced meals!

## Building a Healthy and Balanced Diet

- *Compose the main part of your meal with vegetables and fruit - ½ plate:*

Aim for colour and variety and remember that potatoes do not count as vegetables in the Healthy Eating Plate, because they have a negative effect on blood sugar.





- **Go for whole grains – ¼ of your plate:**

Whole and intact cereals, whole wheat, barley, wheat grains, quinoa, oats, brown rice and foods made from these, such as whole wheat pasta, have a milder effect on blood sugar and insulin than white bread, white rice and other refined grains.



- **Protein power – ¼ of your plate:**

Fish, poultry, beans, and nuts are all healthy, versatile protein sources—they can be mixed into salads, and pair well with vegetables on a plate. Limit red meat, and avoid processed meats such as bacon and sausage.

- **Healthy plant oils – in moderation:**

Choose healthy vegetable oils like olive, canola, soy, corn, sunflower, peanut, and others, and avoid partially hydrogenated oils, which contain unhealthy trans fats. Remember that low-fat does not mean “healthy.”



- **Drink water, coffee, or tea:**

Skip sugary drinks, limit milk and dairy products to one to two servings per day, and limit juice to a small glass per day

- **Stay active:**

The red figure running across the Healthy Eating Plate’s placemat is a reminder that staying active is also important in weight control.

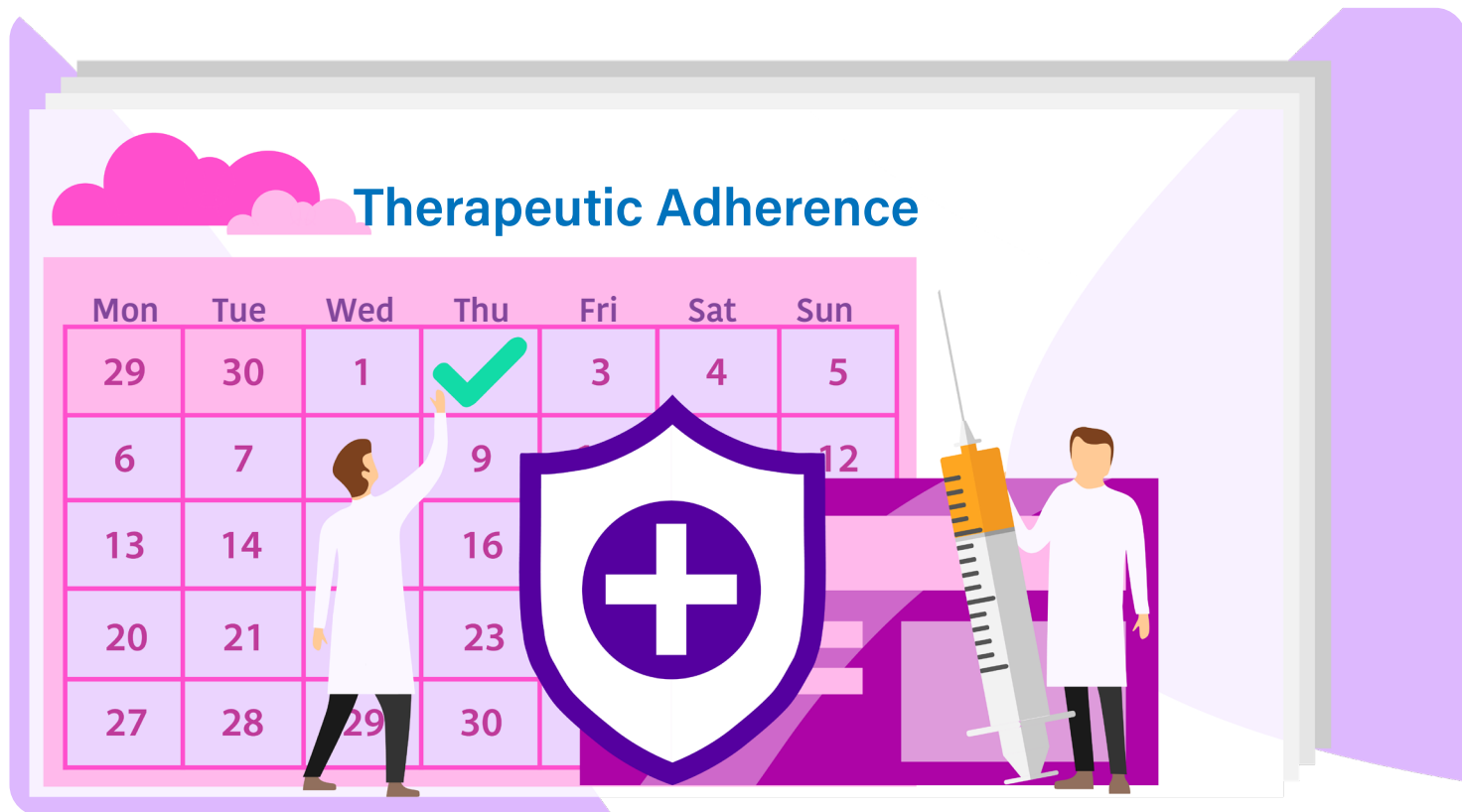


### **The main message of the Healthy Eating Plate is to focus on diet quality:**

- The type of carbohydrate in the diet is more important than the amount of carbohydrate in the diet, because some sources of carbohydrate—like vegetables (other than potatoes), fruits, whole grains, and beans—are healthier than others.
- The Healthy Eating Plate also advises consumers to avoid sugary beverages, a major source of calories—usually with little nutritional value—in the American diet.
- The Healthy Eating Plate encourages consumers to use healthy oils, and it does not set a maximum on the percentage of calories people should get each day from healthy sources of fat. In this way, the Healthy Eating Plate recommends the opposite of the low-fat message promoted for decades by the USDA.

## Therapeutic Adherence

All the information you have received in this Manual will bring less results without your attention to certain aspects of behaviour. It is known from studies that only 25% of people adhere correctly to prescribed therapies (both pharmacological and lifestyle) and there are several reasons for this. This is something to always keep in mind!



### ALWAYS REMEMBER THAT:

*without the CORRECT and CONSTANT intake* (at least 80 per cent of the prescribed annual treatment) of the prescribed drugs, *one loses out:*

- their therapeutic power
- the ability to prevent complications
- quality of life

It is therefore in your interest to avoid reducing the dosage of medication without first consulting your doctor for treatment.



# AMD Foundation Board of Directors

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**Arabic - Bengali - Chinese - French - English - Urdu**

*In cooperation with:*

**AMD 'Interculturality' Working Group**

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