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Diabetes

Prevention and Treatment

A detailed explanation of this condition is given, including its definition, types of diabetes, causes, symptoms, as well as short-term and long-term complications.

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Artichoke
Cynara scolymus



SELF-ANALYSIS OF SUGAR IN THE BLOOD

This is an analysis that only requires a lancet or better yet, a needle with a trigger, a test strip and a small electronic device (glucose meter) to measure the amount of glucose in the blood (they can be found in pharmacies or medical supply stores). Because of its technical simplicity, the individual with diabetes can do this by himself (self-analysis).

1. Frequency. This will depend on the indications from the physician who controls the diabetes. As a general guideline, the following criteria could be applied:



breakfast, lunch (the mid-day meal), or supper.

- **DM2:** In DM2, the fluctuations of glucose in the blood are less than in DM1 so it is not as necessary to do daily self-analyses. They would be sufficient one to three days per week, alternating before breakfast, lunch (the mid-day meal), or supper.

2. Technique:

- **Shake the hands and rub the fingers** to make the blood flow to the fingertips, which is usually the place where the puncture is done.
- **Hygiene:** Wash the hands.
- **Prepare the instruments:**
 - ✓ **Needle.** The needles are used only once. It is placed in a cartridge. Turn the dial of the cartridge to adjust the depth desired (3 mm is advisable). The low numbers indicate little depth; those higher, greater depth of the



Of course, important recommendations on the special care that patients suffering from diabetes must follow are also given.



the more modern meters, the strip is placed in the device before the individual pricks himself.

• The puncture:

- ✓ **Antisepsis:** The area where the puncture will be made is rubbed gently with gauze soaked in an antiseptic (alcohol, hydrogen peroxide, etc.).
- ✓ **Site:** Generally, the individual pricks himself on the side of the tip of the fingers (beside the nail).
- ✓ **The prick:** If he is using only a lancet, he pricks himself in the chosen area. If he is using a cartridge, press the button to make the prick.
- **Collecting the blood:**
 - ✓ **Drop of blood.** For the analysis to be correct, a minimum of blood is necessary. One drop is sufficient.
 - ✓ If a drop of blood does not come out, then press from the root of the finger (near the knuckle) with the hand,



Clinical record

• Age:

- ✓ **DM1 (Type 1 diabetes—insulin-dependent).** It usually begins in infancy or adolescence. About 5-10% of people with diabetes suffer from DM1.

- ✓ **DM2 (Type 2 diabetes—non-insulin-dependent).** It generally affects people older than 40 years of age. About 90-95% of people older than 20 years of age who have diabetes suffer from type 2.

• Gender.

- ✓ **DM1:** Equally affects men and women.
- ✓ **DM2:** It is more frequent in women.

- **Genetics:** People whose families have the first level of diabetes are at higher risk.

• Risk factors.

- ✓ **Obesity and overweight.** A body mass index (BMI) higher than 27 (120% of the ideal weight) has been identified as a risk factor for someone who has diabetes.

- ✓ **Pregnancy** can trigger gestational diabetes in women with predisposed diabetes.

• Frequency:

- ✓ **DM1:** affects 0.2% of the world population.

- ✓ **DM2:** affects 3.6% of the world population.

between 10-15% of the population over 65 years of age and 20% of those

WHEN TO GO TO THE DOCTOR TO KNOW WHETHER YOU HAVE DIABETES

When the following symptoms become evident

- more frequent need to urinate associated with increased thirst,
- fatigue associated with loss of weight,
- or all the symptoms at the same time.

To be certain that a person is suffering from diabetes, the doctor will ask for a blood test. When it is a routine blood analysis, the sugar will have these numbers

- Glycemia after fasting above 110 mg/dl (6mmol/l).
- Glycemia taken at any time is higher than 140 mg/dl (7.8 mmol/l).



DIABETES IN PREGNANCY



About 2-5% of all pregnant women develop gestational diabetes. In countries with a developed health system, 5% of the pregnancies of diabetic women end up with the death of the newborn compared to 1.5% of women without diabetes. The rate of congenital malformations in newborns to diabetic mothers (pre-gestational diabetes) varies from 0-5% in women with medical care during the pregnancy to 10% in women without medical care during the pregnancy. In order to rule out the suspicion of gestational diabetes, a lab test is done that is called "glucose overload test."

thirty-two to thirty-four weeks. A value of glucose in the blood **equal or greater than 140 mg/dl (7.8 mmol/l)** without respect to the time of day or the time of the last meal means that the pregnant woman has the **risk** of having **gestational diabetes**.

- **An overload of 100g of glucose** and the determination of the glycemia after fasting, one hour after ingesting the glucose, after two hours, and after three hours. This test is done in pregnancies when the result of the O'Sullivan test is positive in order to confirm or rule out a diagnosis of gestational diabetes. It should be done first thing in the morning after a fast of eight to fourteen hours. **Two or more values higher than the following** are considered to be a diagnosis of **gestational diabetes**:

Time	Glycemia* mg/dl (mmol/l)	
	ADA**	NDDG***
Fasting	95 (5.23)	105 (5.78)
		120 (6.67)

- Neutral soap.
- Washing:
 - ✓ Rub without scratching to avoid injury.
 - ✓ Time: never go over five minutes to avoid softening of the skin.
- Drying:
 - ✓ With a soft, light-colored towel that will allow any existing injuries to be seen.

How to cut the

- **Cut and straight.** Cut them straight and at the same level as the rest of the toe. Do not cut the sides.
- Implements:
 - ✓ Scissors: not too sharp.
 - ✓ File: of medium size.

Attention!



- **Avoid having the feet submerged more than ten minutes and conscientiously dry between the toes** since otherwise, the skin could get

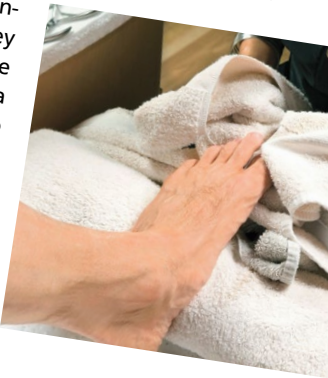
soft and dry easily.
• Never dry the feet with a towel that causes injury.
• Inspect the feet daily for any changes.
• Hydrate the skin with a moisturizer.
• Moisturize the skin between the toes.

There are scientific treatments against diabetes that can be combined with natural remedies in order to obtain better results.

TREATMENT

THE DIABETIC PERSON'S FEET

Diabetic are especially sensitive to neuropathy so they must use a mirror or a mirror to find any injury no matter how small it may be since it could lead to possible amputation. MEDICAL TERMS, page 10. Injury in the foot is a serious problem. It should go to the doctor.



- Washed: water: warm (37°C).
- ✓ With light strokes, that is, without rubbing hard.
- How to cut the nails:
 - **Cut and straight.** Cut them straight and at the same level as the rest of the toe. Do not use sharp objects on the sides of the nails.
 - Implements:
 - ✓ Scissors: with a rounded end and sharp blades.

HOW TO PREVENT AND CONFRONT DM2 AND ITS COMPLICATIONS



- It has been shown that practicing healthy habits prevents the appearance of at least 35-60% of all cases of DM2^{1, 2} and reduces its complications.
- **Eating a complete and balanced diet** (see DIETOTHERAPY, page 32).
 - ✓ **Fats: Less than 30% of the total daily caloric intake.** Eat polyunsaturated vegetable fats.
 - ✓ **Fiber: 15 g/1000 kcal.**
 - ✓ **Whole grains, vegetables and fruits.**
 - ✓ **Skimmed or low-fat milk.**
 - ✓ **Vegetable oils rich in monounsaturated fatty acids.**
 - **Control the weight.** An appropriate weight helps the body to use the insulin in a more effective way. Overweight people (a BMI higher than 25 (see BODY MASS INDEX, page 14) should lose weight until they reach a normal weight (BMI of 18.5-25).
 - **Be physically active every day.** Do moderate physical exercise for **thirty minutes a day:** walk, run, swim, ski, care for a garden. . . . It is the key to the health of the arteries and the heart. Walking in a moderate or intense rhythm for thirty minutes or more each day prevents DM2.³ One way of carrying out this exercise is to walk ten minutes in a moderate or intense rhythm immediately after each one of the three main meals of the day.
 - Do not smoke.
 - Do not consume alcohol.
 - Avoid stress. Practice relaxation exercises if necessary.



Nutrition is very important in the prevention and control of diabetes. The food pyramid help us understand what type of food we should consume more.

Dietotherapy

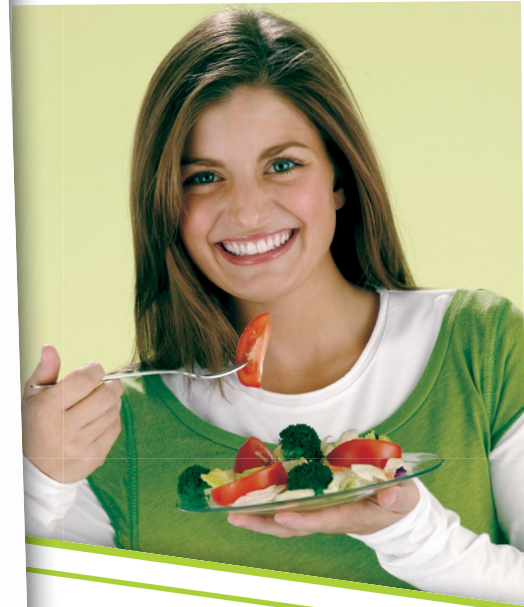
Diabetes is a disease in which diet control is the cornerstone of the treatment; it is even to the point that the cause and unleashing of DM2 (type 2 diabetes), apart from a certain family predisposition, is basically due to the overweight and obesity that are found to be closely tied to incorrect eating habits (foods rich in sugars, fats and processed foods), in addition to the lack of physical exercise.

A healthy and balanced diet allows proper control of the levels of glucose in the blood, body weight, blood pressure, levels of cholesterol and triglycerides in the blood—all of which is related to diabetes.

The diet of people with diabetes does not consist in eating "dietetic" food that is for people with diabetes or in following complicated diets. The diet should include a wide variety of foods, complete, pleasing to the palate and adequate for the needs of each person.

The basic principles of a diet for people with diabetes are, in fact, the same as those that are recommended for any person who wants to follow a healthy diet. The objectives of a diabetic diet are

- To assure a nutritional balance to favor the normal growth of children and adolescents



FOOD PYRAMID AN OVO-LACTO VEGETARIAN D

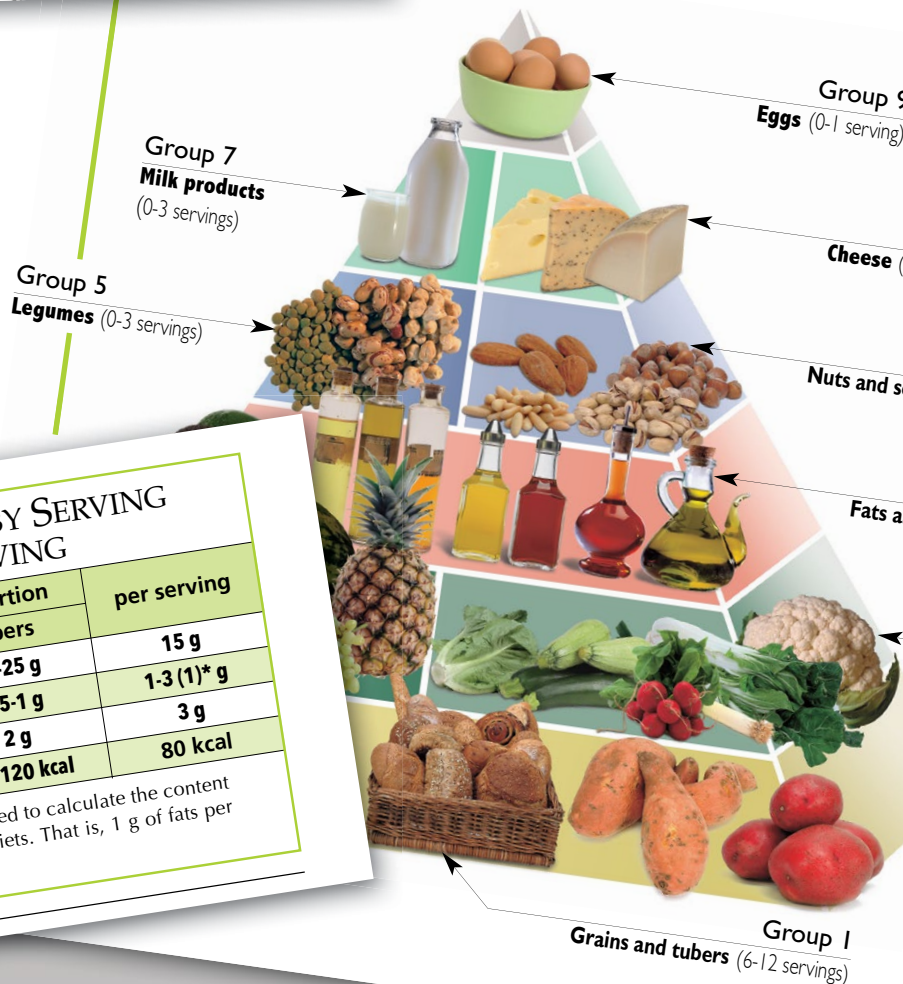
Fruit especially indicated in diabetes

- Blueberries

✓ Benefits:

- ◆ **Hypoglycemic:** Experimental studies show that the consumption of blueberries decreases the concentration of glucose in the blood.¹⁷

- ◆ **Prevent diabetic retinopathy:** The flavonoids in blueberries (anthocyanosides) reduce



GRAINS AND TUBERS: COMPOSITION BY SERVING AND PER 100 G OF EDIBLE SERVING

Macronutrients		per 100 g of edible portion		per serving
		grains	tubers	
Energy (kcal)	carbohydrates	65-85 g	15-25 g	15 g
	fats	0.1-4 g	0.5-1 g	1-3 (1)* g
	proteins	6-13 g	2 g	3 g
		250-350 kcal	90-120 kcal	80 kcal

* The number in parentheses (1) is the average number that is used to calculate the content of fats per serving of grains and tubers in the preparation of diets. That is, 1 g of fats per serving of grains and tubers.

Nuts and seeds (group 6)

Nuts and seeds (see FOOD PYRAMID FOR AN OVO-LACTO VEGETARIAN DIET, page 35) provide vegetable fats, protein, vitamins and minerals.

• Benefits:

✓ **Nuts:** Because of their abundant content in vitamins in the B group, zinc, magnesium, calcium and polyunsaturated fatty acids, they are greatly recommended for people with diabetes (see SUPPLEMENTS, page 61).

✓ **Seeds:** Rich in unsaturated fatty acids, they prevent the onset of DM2.²⁷

• **Recommended daily amount:** 0-3 servings for an adult with moderate activity. It is not necessary to eat nuts and seeds every day as it is to eat grains and tubers, vegetables, fruit and fats. It is advisable not to go over 3 servings in one day and 4, if physical activity is intense.

• **Servings:** One serving of any of the foods that make up the nuts and seeds



Nuts and seeds are very pleasant to eat and give the human body vitamins, minerals, proteins.



• **Recommended daily amount:** 4-7 servings, for an adult with moderate activity. The advisable minimum is 4 servings and the maximum is 7. Nevertheless, it is



Our bodies need to have oils and fats, but these must come from vegetables and not from animals. For this reason, we recommend in this Practical Guide to Health that the fats come from nuts, olive oil and other seeds.

possible that he could eat less than 4 servings one day, but it should not go over 4 servings and 8, if his physical activity is intense.

FATS AND OILS: COMPOSITION BY SERVING AND PER 100 G OF EDIBLE PORTION

		per 100 g of edible portion	per serving
Macronutrients	carbohydrates	0-6 g	0 g
	fats	10-100 g	5 g
	proteins	0-20 g	0 g
Energy (kcal)		64-900 kcal	45 kcal



cells from dying⁴⁰ and increase the development of new beta cells.⁴¹

In addition, in studies with human pancreas cells, GLP-1 slowed down the damage of diabetes to the pancreas and lengthened the life of the beta cells. This makes experts think that it could open the way for a possible cure for DM2.

• **Recommended daily amount:** 25-35 g of fiber, including at least 7 g of soluble fiber and 28 g of insoluble fiber. This amount is provided by consuming, for example:

✓ Five fruits a day, one fresh salad, 3 slices of whole grain bread and a dish of lentils, or

✓ Two tablespoons of wheat bran (insoluble fiber), one cup of fava beans and two oranges (soluble and insoluble fiber).

• **Dietary sources and types of fiber.**

✓ **Soluble fiber** is formed by the following compounds: inulina, gums, pectins and mucilages.

• **Dietary sources:** Grains (oats, barley, corn), legumes (fava beans, chickpeas (garbanzos), kidney beans, peas, pinto beans), fruit (apples, pears, peaches, oranges), root vegetables (carrots, beets), etc.

✓ **Insoluble fiber** usually contains compounds such as: cellulose, hemicellulose and lignin.



Moreover, it includes an interesting diet plan and attractive recipes to helps us implement changes in our nutrition.

2,000 KCAL DIET

SUNDAY – 1st DAY (1.995 KCAL)

BREAKFAST



Food	Amount	Food group	Energy
vegetable quesadillas (see directions, page 88)	2 servings (2 tortillas = 60 g)	grains and tubers	400 kcal
corn or wheat tortillas (see directions, pages 88-89)	¼ serving (20 g)	vegetables	
onion	1 serving (½ cup = 125 g)	vegetables	
tomato sauce	½ serving (½ cup = 50 g)	vegetables	
zucchini	½ serving (½ cup = 50 g)	vegetables	
sweet peppers	1½ servings (1½ slices = 45 g)	cheese	
Gruyère cheese	1 serving (1 tsp. = 5 ml)	fats and oils	
olive oil			
salt			107 kcal
yogurt and peach jam		fruits	
sugarless peach jam (see directions, page 89)	½ serving (2 tbsp. = 30 g)	milk products	
skimmed or low-fat yogurt	1 serving (¾ cup = 125 g)		325 kcal
soy milk and cornflakes		grains and tubers	
cornflakes without sugar	2½ servings (¾ cup = 75 g)	legumes	
soy milk	1½ servings (1½ cups = 300 ml)	Total breakfast	832 kcal



Food
shake (juice + pulp) of mango, papaya, pineapple, banana, orange (see directions, page 91)
whole wheat biscuits

TABLE 1

Food Groups	Number of servings consumed*												kcal/ serving	total energy food groups**
	1	2	3	4	5	6	7	8	9	10	11	12		
1. Grains and tubers (6-12)														
2. Vegetables (5-10)													80	
3. Fruits (5-8)													25	
4. Fats and oils (4-7)													60	
5. Legumes (0-3)													45	
6. Nuts and seeds (0-3)													100	
7. Milk products (0-3)													100	
8. Cheese (0-2)													95	
9. Eggs (0-1)													100	
Total energy / day (kcal)***													100	

* Each...

DIET PLAN ACCORDING TO DAILY ENERGY CONSUMPTION

Food Groups	1,600 kcal/day children 4-8 years of age, women, adults of advanced age	2,200 kcal/day children 8-12 years of age, adolescent women, active women, sedentary or moderately active men	2,800 kcal/day adolescent men, active men
	Servings		
Grains and tubers	5-10	6-12	7-14
Vegetables	4-8	5-10	6-12
Fruits	4-6	5-8	5-9
Fats and oils	4-6	4-7	5-8
Legumes	0-3	0-3	0-4
Nuts and seeds	0-3	0-3	0-4
Milk products	0-2	0-3	0-4
Cheese	0-2	0-2	0-3
Eggs	0-1	0-1	0-1

with an "X" in the corresponding food group and at the end of the added up for each food group. determined by multiplying the number from the "total" of servings of each number of energy (kcal/serving). Example: servings of fruit: 5 x 60 = ded from the sum of all the numbers found in the "total energy/food

Serving macronutrients (g)			number of servings recommended (2,000 kcal diet)
carbohydrates	fats	proteins	
15 g	1 g	3 g	6-12
5 g	0 g	1.5 g	5-10
15 g	0 g	0 g	5-8
0 g	5 g	0 g	4-7
13 g	2 g	8 g	0-3
2 g	9 g	2.5 g	0-3
12 g	1.5 g	8 g	0-3
1 g	7 g	8 g	0-2
1 g	7 g	8 g	0-1



Tisanes are an excellent way to reduce blood sugar levels. A wide variety of tisanes and the way of preparing them is provided.

Phytotherapy

The use of plants to cure or prevent minor and even serious illnesses has been a traditional custom in the whole world since antiquity. However, in the last decades, the pharmaceutical industry, prestigious international centers of biomedical research and even the World Health Organization (WHO) have invested considerable resources, (people as well as economic) in the discovery and research of the therapeutic properties of new plants, and also in many of those traditionally known for their therapeutic virtues.⁵⁶

The use of medicinal plants is widely known as a very effective way to control the high levels of sugar in the blood (hyperglycemia) in people who suffer from diabetes; even if the administration of insulin or oral antidiabetic drugs is required, the use of medicinal plants improves the levels of glycemia which allows the significant reduction of the dosage of insulin or drugs.

The plants that are most effective in the treatment and control of diabetes, the traditional use as much as those most recently discovered, are those that we present in this book where the combinations of appropriate plants are explained as well as the practical way to prepare them in the home and the therapeutic dosage recommended.



Medicinal plants, along with the dietary treatment of diabetes, can reduce the need for taking medications and even substitute for them in some cases. By using herbal teas, a great number of active elements can be extracted without changing their properties and still maintaining their chemical structure.

Herbal Teas ... (each time).

Hypoglycemic Herbal Tea II

- **Indications:** diabetes types 1 and 2.
- **Composition:**

Plant	Part used	Amount
Artichoke <i>Cynara scolymus</i>	leaves	20 g (5 tbsp.*)
Eucalyptus <i>Eucalyptus globulus</i>	leaves	30 g (7-8 tbsp.*)
Ginkgo <i>Ginkgo biloba</i>	leaves	20 g (5 tbsp.*)
Glucomanano <i>Amorphophallus konjak</i>	rhizome	20 g (2 tbsp.*)



Artichoke
Cynara scolymus

- **Decoction:** 2 tablespoons (20 g) per 200 ml of water. Boil for 5 minutes. Then add 1 tablespoon of fresh brewer's yeast (*Saccharomyces cerevisiae*) or 1 teaspoon of dry brewer's yeast (5 g).
- **Amount to take:** 3 cups a day. Take it a half hour before the main meals with plenty of water (at least 1-2 cups each time).



* The exact amount is given in grams (g), and the approximation in tablespoons (tbsp). Leaves and flowers: 1 tbsp. = 4 g.

Hypoglycemic Herbal Tea III

- **Indications:** diabetes types 1 and 2.
- **Composition:**

Plant	Part used	Amount
Bilberry/Blueberry <i>Vaccinium myrtillus</i>	leaves and berries (fruit)	20 g (5 tbsp.*)
Eucalyptus <i>Eucalyptus globulus</i>	leaves	20 g (5 tbsp.*)
Devil's claw <i>Harpagophytum procumbens</i>	root	20 g (2 tbsp.*)
Walnut <i>Juglans regia</i>	leaves	10 g (2,5 tbsp.*)
Sage <i>Salvia officinalis</i>	leaves and flowering tips**	10 g (2,5 tbsp.*)

- **Decoction:** 2 tablespoons (20 g) per 200 ml of water (10 tablespoons or 50 g/l). Boil for 5 minutes.
- **Amount to take:** 3 cups a day. Take it a half hour before the main meals.



Bilberry/Blueberry
Vaccinium myrtillus



Hypoglycemic Herbal Tea IV

- **Indications:** diabetes types 1 and 2 and gestational diabetes.
- **Composition:**

Plant	Part used	Amount
Onion <i>Allium cepa</i>	bulb	10 g (2-3 tbsp.*)
Glucomanano <i>Amorphophallus konjak</i>	rhizome	25 g (2,5 tbsp.*)
Fennel <i>Foeniculum vulgare</i>	fruit, root, and leaves	25 g (4-5 tbsp.*)

- **Decoction:** 2 tablespoons (15 g) per 200 ml of water (10 tablespoons or 35-40 g/l). Boil for 5 minutes.
- **Amount to take:** 3 cups a day. Take it a half hour before the main meals with plenty of water (at least 1-2 cups each time).



Fennel
Foeniculum vulgare

* The exact amount is given in grams (g), and the approximate amount in tablespoons (tbsp). Leaves and flowers: 1 tbsp. = 4 g.
Roots: 1 tbsp. = 10 g.

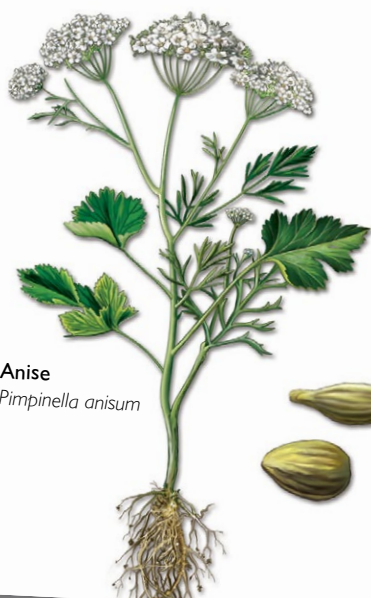
... pages 136-138.

Hypoglycemic Herbal Tea V

- **Indications:** diabetes types 1 and 2 and gestational diabetes.
- **Composition:**

Plant	Part used	Amount
Onion <i>Allium cepa</i>	bulb	10 g (2-3 tbsp.*)
Anise <i>Pimpinella anisum</i>	fruit	20 g (4-5 tbsp.*)
Fennel <i>Foeniculum vulgare</i>	fruit, roots and leaves	25 g (4-5 tbsp.*)

- **Decoction:** 2 tablespoons (15 g) per 200 ml of water (10 tablespoons or 35-40 g/l). Boil for 5 minutes.
- **Amount to take:** 3 cups a day. Take it a half hour before the main meals with plenty of water (at least 1-2 cups each time).



Anise
Pimpinella anisum



Coccinia indica

Physical exercise is another great secret that helps prevent and control diabetes. This section offers valuable advice on how to implement it to daily life.



Physiotherapy

Physical exercise is one of the basic pillars for the treatment of diabetes. Adequate and regular exercise will manage to decrease the dosage of insulin in DM1 (*diabetes mellitus* type 1, see TYPES OF DIABETES, page 11), and, along with a proper diet, can even be enough to control it in DM2 (*diabetes mellitus* type 2).

Physical activity is good, independent of whether or not a person has diabetes or not, but if he has diabetes, exercise is not an option but part of the treatment. Staying active helps the individual to feel more fit, and not only that, also to feel happy and optimistic, something that is essential when a person has diabetes. This is especially true among younger people because sometimes it is not accepted by the individual to realize day after day that he has a disease he must live with for the rest of his life. Thus, the physical ailment that is typical of the disease is added to the mental ailment. However, the most important thing is that exercise helps to control the levels of glucose and helps to reduce weight, something that is extremely important in diabetes.

Some people wrongly believe that doing physical exercise is just riding a bicycle, swimming or going to the gym. Not at all. Climbing stairs, cleaning the house, going shopping, digging in the garden, cutting the grass, etc., in addition to being useful tasks, are

- tions of moderate heat and humidity are preferable. In hot seasons or climates where the sun's rays are the strongest.
- ✓ In order to practice sports or physical exercise that requires a certain intensity, it is advisable to allow at least one hour to go by after eating.
 - **Intensity:**
 - ✓ Begin with stretching in order to pre-

Those who suffer from diabetes should know what type of physical exercise they should do. This A PRACTICAL GUIDE TO HEALTH recommends what should be ideal, always taking into account the degree of suffering of the disease. For example, the feet should not be subjected to excessive pressure in diabetic neuropathy.



INGESTION OF SUPPLEMENTARY CARBOHYDRATES AND PHYSICAL EXERCISE		
Exercise intensity (duration and type)	Glucose in the blood mg/dl (mmol/l)	Consumption (30 minutes)
Light: 1-2 h.: walking Less than 30 minutes: jogging, bicycle riding, tennis	less than 100 (5.5)	10-15 g of carbohydrates (1 slice of bread)
	more than 100 (5.5)	No supplement required
Moderate 30 minutes – 1 hour: tennis, swimming, running, golf, bicycling	less than 100 (5.5)	25-50 g of carbohydrates (1 slice of bread and 1-2 pieces of fruit)
	100-180 (5.5-10)	25-35 g of carbohydrates (1 slice of bread and 1 piece of fruit)
	180-300 (10-16.5)	No supplement or snack required
	more than 300 (16.5)	Do not do exercise
High 1-2 hours: football, tennis, hockey, swimming, etc.	less than 100 (5.5)	50 g of carbohydrates (2 slices of bread and 1 piece of fruit or 1 glass of fruit juice or 1 glass of milk or a yogurt)
	100-180 (5.5-10)	25-50 g of carbohydrates (1 slice of bread and 1-2 pieces of fruit)
	more than 180 (10-16.5)	10-15 g of carbohydrates (1 slice of bread and 1 piece of fruit)



Hydrotherapy

Hydrotherapy consists in treatment using water with the objective of revitalizing the body and maintaining health. Correctly applied, water produces a stimulation of the nervous system, increases circulation of the blood, induces a thermic reaction of the skin, tones the muscles, etc.—everything that favors the restoration of the body in its totality.

Hydrotherapy treatments that are traditionally used in diabetes alternate cold and hot applications to the abdomen by means of wrapping, compresses and showers. These treatments are applied empirically, but have never been validated by reliable scientific research. Nevertheless, a study was done in the last few years that produced surprising results. The *The New England Journal of Medicine*,⁶³ one of the most prestigious publications in the field of medicine, said in 1999 that the application of hydrotherapy in people with DM2 notably improved the quality of life of those with diabetes and reduced their weight; however, in addition, hydrotherapy managed to reduce the levels of blood sugar by 13% and glycosylated hemoglobin by 1% independent of diet, exercise or medication as much if they had insulin injections or if they took oral antidiabetic medication. The beneficial effects of hydrotherapy were already quantifiable ten days after beginning the hydrotherapy treatment.

Hydrotherapy is also an important technique for controlling diabetes. Dr. Gelabert explains how we can make the most of it.



Hydrotherapy treatment stimulates the nervous system and improves the circulation of the blood. Water has powerful and curative powers in treating diabetes. It is possible to considerably reduce the levels of sugar in the blood with complete baths for the whole body.

Hydrotherapy Technique

- **Complete bath of the whole body:**
 - ✓ **Indications:** Diabetic people who do not do rigorous activity and who do not maintain a constant weight, judging by the fact that they have a tendency to be overweight. It stimulates the circulation of the blood.

water should vary between 38°C (100°F) and 40°C (104°F), or 41°C (106°F) as a maximum. The water jets can also be alternated, first hot and then cold, may even be done a couple of times, and end with cold water jets.

- ✓ **Time:** The application of 15 to 20 minutes.

Finally, the author explains the importance of medication in diabetes treatments, as oral anti-diabetics and insulin.



Medication

Diabetes is not an infectious disease like, for example, pneumonia or a urinary tract infection for which a course of antibiotics is taken and is cured without anything more; neither is it a surgical intervention that is resolved after a short stay in the hospital and a somewhat lengthy period of recovery. Diabetes is a chronic disease that can be controlled effectively but not cured, and when insulin is required, as in the case of DM1, it is for life. Logically, following an adequate life style, that is, a healthy diet, a regular exercise program, taking medicinal plants, in short, following all the advice given in this PRACTICAL GUIDE TO HEALTH, will allow a person to reduce significantly the amount of insulin that must be injected or reduce to the maximum the need to take oral antidiabetic medication.

Medication (oral antidiabetic drugs and insulin) is not a cure but a treatment to prevent the short-term complications of diabetes (hypoglycemia, hyperglycemia, etc.) and the long-term complications (retinopathy, neuropathy, etc.). In order to reach this objective, it is necessary to have all the information about the medication that is taken.

In the case of DM2 (type 2 diabetes), the better

S. PREVENTION AND TREATMENT

Choice of Oral Antidiabetic Drugs

choice of an oral antidiabetic medication for a person with DM2 requires a trial until the physician verifies which antidiabetic drug and what dosage best controls the levels in the blood.

many options, the most usual are:

Option: metformin

Indication: It is a drug that is generally well tolerated and the only thing that has been demonstrated is a decrease in the risk of cardiovascular mortality in people with diabetes associated with overweight.

End of therapeutic trial: If, after a period of 2-3 months, the percentage of glycosylated hemoglobin (HbA_{1c}) (see ANALYSIS OF GLYCOSYLATED HEMOGLOBIN (page 19)) is not 7% or less, then the next option should be chosen.

Option:

Alternative: metformin and a sulfonylurea

Indication: It is useful when the single therapy of metformin in maximum doses fails.

♦ **Secondary effects:** The greatest disadvantage of this combination is that it presents a greater risk of hypo-

When natural control of type 2 diabetes is not achieved, then advise the patient to take. However, that all drugs are not the human body.

glycemia combining second-line drugs. ✓ **Second-line drugs:** glitazones ♦ **Indications:** combining of hypo-



Even though we, in this PRACTICAL GUIDE TO HEALTH, recommend following scientific and natural treatments in order to reduce the need for taking antidiabetic medication so far as possible, we recognize that certain diseases, like diabetes, also need medication controlled by medical professionals.

Medication (insulin or oral antidiabetic drugs) and methods of administering it must necessarily be indicated and controlled periodically by a physician. The reader will be surprised that this book is an extraordinary

physical exercise should be treated with drugs as well.

When to begin the treatment with oral antidiabetic drugs

In DM2, the deterioration of the function of the pancreas across the produc-

OBJECTIVES OF CONTROLLING GLYCEMIA

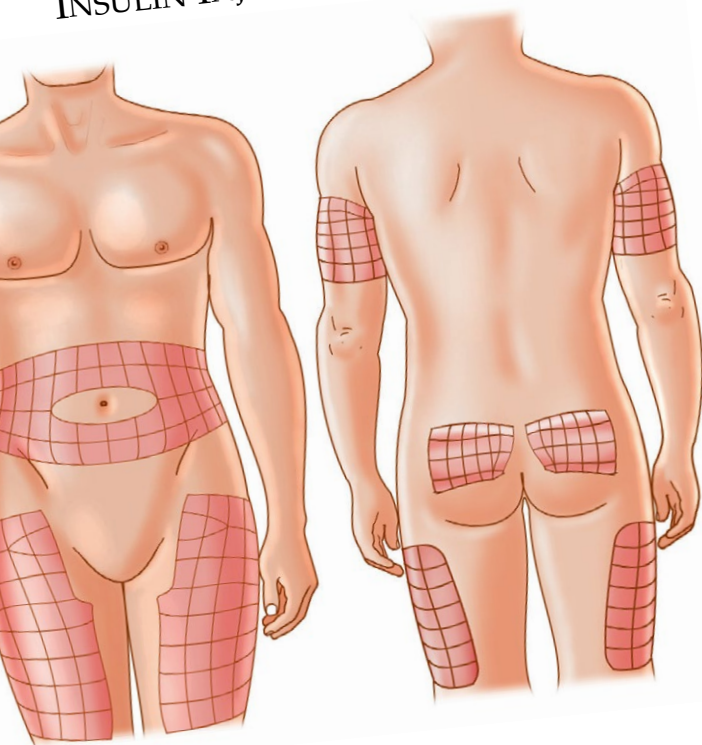
Glycemia		Normal (without diabetes)	Glycemia Optimal
HbA _{1c} * (%)		Less than 6%	less than 6.5
Glycemia while fasting	mmol/l	Less than 5.6	4.5-6
	mg/dl	Less than 100	80-110
Glycemia after meals***	mmol/l	Less than 7.8	4.5-8
	mg/dl	Less than 140	80-145

* See ANALYSIS OF GLYCOSYLATED HEMOGLOBIN (page 19).

** Numbers of HbA_{1c} (glycosylated hemoglobin), glycemia while fasting are higher than those indicated in the table in the acceptable column is considered so the therapeutic plan that is being carried out must be reconsidered.

*** 1-2 hours after eating.

INSULIN INJECTION SITES



The last, however, would be the most recommended for the injection of

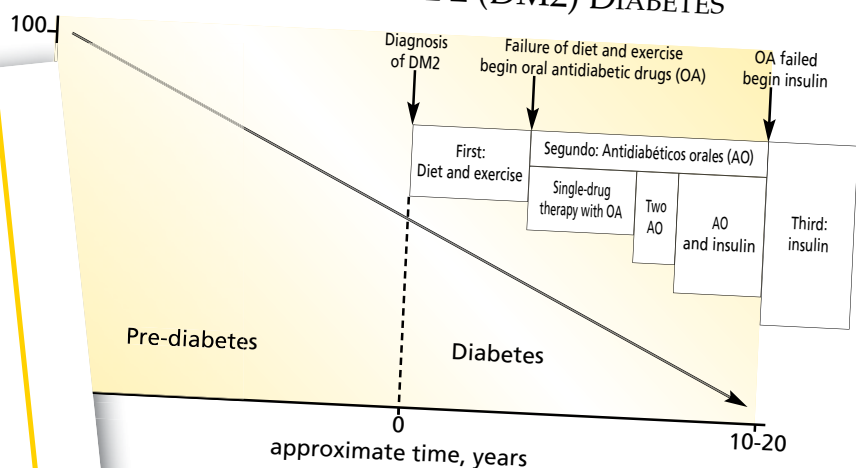
preferred sites are
Upper arms: The top and outer side of the upper arm.
Upper buttocks: The upper outer side of the buttock.
Abdomen: Two finger widths from the navel and below, avoiding the navel and below, leaving a free area around the navel.
 The outer, upper arm is preferred except in children under 12 years of age.
 It is necessary to change the site from one injection to another, not the area since the same areas is very difficult to rotate. The area of most preference is the abdomen, followed by the arms, the upper buttocks, and finally, the slowest is the

When the levels of glycemia on successive days are found to be outside what is desired, and this is not due to modifications of diet or exercise, then the insulin dose must be adjusted.

It is recommended that making **modifications in the dosage**, as much to raise as to lower, should be done **slowly and gently**: **1-2 IU each time**, and in no case should it go above 3 IU, and **only one dose of insulin should be modified per day**. In general, the rule of supplementing 1 IU of insulin for every 50 mg/dl (2.75 mmol/l) that exceeds the desired glycemia before meals should be used as a guide. It will not be possible to make adjustments based on a single measurement of sugar in the blood. In order to check whether the modification of the dosage has been effective



EVOLUTION OF TYPE 2 (DM2) DIABETES



th DM2 usually goes through stages that are before the diagnosis of DM2, a phase without apparent symptoms they exist, the individual may not have any signs of the disease, the ability of the beta cells to produce insulin is enough to take care of the physiological needs so the individual does not present symptoms of dia-

ty of the beta cells decreases gradually until the symptoms appear and consequently the time between the diagnosis of diabetes and DM2 properly can be around ten years.

THE RISK OF HAVING DIA-

✓ **Single-drug therapy with OA:** At the beginning of the diagnosis of DM2, a single OA drug is usually enough.

✓ **Two OA:** After a certain amount of time, the combination of two OA's is usually necessary.

✓ **OA and insulin:** If the numbers of sugar in the blood cannot be controlled, it will be necessary to add insulin to the OA.

• **Third. Insulin:** If, in spite of everything, the diabetes is still not controlled, the solution will be treatment based on insulin.

This whole evolution is slow and usually takes 10-20 years from the beginning of the diagnosis of diabetes, depending on whether the glycemia has been

✓ One dose:

♦ **Single dose of intermediate or long acting insulin at breakfast.** It is useful for **people who are more than 65 years of age** who maintain an acceptable basal glycemia (140 mg/dl [7.8 mmol/l]) but who do not have good control throughout the day.

♦ **Single dose of intermediate or long acting insulin before going to sleep** for those diabetics who have **basal hyperglycemia** (when the person wakes up in the morning and has not eaten in the hours immediately previous) and that is not secondary to a hypoglycemia that is produced during the night (nocturnal hypoglycemia).

✓ Two doses:

♦ **One morning dose (before breakfast) and another in the afternoon or night (before the afternoon snack or supper) of intermediate insulin.** It is

shows how important the advice of a proper diet and exercise) as set for TO HEALTH in order to maintain one's health or at least, put off as long as possible, the least long- and or that they present a fast gravity.

The doctor will always determine the medication and the dosage of insulin that the diabetic person needs to have administered in order to maintain the desired levels of glucose in the blood. It is necessary for diabetics to control their numbers of glucose so that they do not go too high.

Diabetes, prevention and treatment, a work that will help improve many people's quality of life. Get it today!

Bibliographic References

1. LINDSTROM, J.; ILANNE-PARIKKA, P.; PELTONEN, M.; AUNOLA, S.; ERIKSSON, J. G.; HEMIO, K.; HAMALAINEN, H.; HARKONEN, P.; KEINANEN-KIUKAAN- NIEMI, S.; LAAKSO, M.; LOUHERANTA, A.; MANNELIN M.; PATURI, M.; SUNDVALL, J.; VALLE, T. T.; UUSITU PA, M.; TUOMILEHTO, J.; FINNISH DIABETES PREVEN- TION STUDY GROUP (2006). "Sustained reduction in the incidence of type 2 diabetes by lifestyle intervention: follow-up of the Finnish Diabetes Prevention Study". *The Lancet*, vol. 368, 9,548 (November), pp.1,673-1,679.
2. HU, F. B.; MANSON, J. E.; STAMPER, M. J.; CO G.; LIU, S.; SOLOMON, C. G.; WILLET, W. C. (2002). "Diet, lifestyle, and the risk of type 2 diabetes mellitus in women". *The New England Journal of Medicine*, vol. 345, no 11 (September), pp. 790-797.
3. SATO, K. K.; HAYASHI, T.; KAMBE, H.; NAKA HARITA, N.; ENDO, G.; YONEDA, T. (2007). "Physical activity and the risk of type 2 diabetes: a meta-analysis". *Diabetes Care*, vol. 30, pp. 2,296-2,299.
4. UNITED KINGDOM PROSPECTIVE DIA
9. VALACHOVICOVÁ, M.; KRAJCOVICOVÁ-KUDLÁČKOVÁ, M.; BLÁŽÍČEK, P.; BABINSKÁ, K. (2006). "No evidence of insulin resistance in normal weight subjects". *Journal of Nutrition*, vol. 136, no 1, pp. 10-14.

DIABETES. PREVENTION AND TREATMENT

Glossary of Medical Terms

Amino acid: Amino acids are the basic structural units of proteins.

alpha-linolenic acid: It is a polyunsaturated fatty acid (omega-3). Food sources: borage, green leafy vegetables (cabbage, lettuce, spinach, etc.), spirulina, grains, nuts, linseed (flax), evening primrose, pumpkin, olive, canola or rapeseed and soya oil.

amputation: It is the cutting and separation of an extremity of the body by surgery. As a surgical method, it is used to control pain or a disease process in the affected extremity, for example, gangrene.

creatinine: It is an organic compound excreted from the deterioration of creatine and normally filtered by the kidneys and excreted with the urine. Measuring the creatinine is the simplest way of checking the function of the kidneys.

Dietary fiber: It is formed by polysaccharides that are resistant to the action of the digestive enzymes in the human and so cannot be digested. Dietary fiber is only found in foods of plant origin such as grains, fruits, vegetables and legumes.

dietotherapy: The treatment of disease in which the diet, or of those more specifically linked to the disease, is changed through the use of diet.

DM1: Abbreviation of type 1 or insulin-dependent diabetes.

DM2: Abbreviation of type 2 or non-insulin-dependent diabetes.

"Empty" calories: They are called "empty" calories because they come from foods that contribute very little more than energy value. Examples of foods with "empty" calories are alcoholic beverages, sodas, candies or sweets.

essential amino acids: Some amino acids are called essential because the human body is not able to synthesize them on its own which means they must be obtained through the diet.

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Are you suffering from diabetes?

Diabetes is one of the most important diseases in the world. About 250,000,000 people suffer from it even though many of them are unaware that they have a low-grade form of it.

Dr. Gelabert's clear, complete, and direct advice provides the best guidance for knowing if you suffer from diabetes and how to prevent it. If you already know that you have this disease, you will discover how to control it by the use of the most advanced methods and scientific and natural treatments.

