



WHAT IS **DIABETES MELLITUS?**

TYPES, RISK FACTORS AND MEASUREMENT

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WHAT IS DIABETES MELLITUS?

In Germany, about 6.7 million people suffer from diabetes, with a further 2–5 million being affected who are unaware of their illness.

Diabetes mellitus is present when there is too much glucose in the blood (high blood glucose level). Glucose is an important source of energy for the organism. It is so important for us that our body produces it when we need it, even though the major portion comes from the food we eat.

Blood glucose is regulated by the hormone insulin, which is produced in the pancreas.

- ✓ Insulin is able to bring glucose (and thus energy) into the cells of the muscles, liver and fatty tissue.
- ✓ If insulin is present in insufficient quantities, the glucose accumulates in the blood and diabetes develops.

Medicines and above all the right lifestyle "cleanse" the blood, ensure correct functioning of the metabolism and prevent possible long-term damage to the organs.

WHICH TYPES OF DIABETES ARE THERE AND HOW DO YOU NOTICE THEM?

TYPE 1 DIABETES, T1

This results from the destruction of the insulin-producing cells of the pancreas (the beta cells).

This leads to a lack of insulin, so that the glucose in the blood cannot be processed properly. This type of diabetes is always treated with insulin in order to control blood glucose optimally.

TYPE 2 DIABETES, T2

This is a combined disorder: on the one hand the insulin cannot function properly (insulin resistance), on the other hand the pancreas does not produce sufficient insulin. In a first step, this type of diabetes is treated with a balanced diet, increased physical activity and by losing weight. Later on, treatment can include the administration of drugs, and insulin if necessary.

Other special types of diabetes include:

- ✓ Gestational diabetes (occurs during pregnancy)
- ✓ And less frequent types such as:
 - ✓ Genetically caused diabetes
 - ✓ Drug-induced diabetes (for example during cortisone therapy)
 - ✓ Diabetes caused by certain diseases of the pancreas

The main symptoms caused by elevated blood glucose in diabetes include:

- ✓ Frequent urge to urinate
- ✓ Fatigue
- ✓ Excessive thirst
- ✓ Weight loss
- ✓ Deterioration of eyesight



Type 1 diabetes: the symptoms occur suddenly, especially in type 1 diabetes.

Type 2 diabetes: the above-mentioned symptoms are often not present, or in mild form only. The disease usually begins gradually over a period of several years and is often only discovered by chance in a blood test.

RISK FACTORS FOR TYPE 2 DIABETES

Factors that may predispose for onset of type 2 diabetes:



In many people, type 2 diabetes can be prevented or delayed by a timely change in an unhealthy lifestyle (insufficient diet, poor eating habits).



WHY IS OPTIMAL DIABETES MANAGEMENT IMPORTANT?

A permanently high blood glucose level in diabetes can lead to secondary damage. The heart, kidneys, nerves (especially of the feet), as well as blood circulation in the brain, legs and eyes may be affected.

To prevent such secondary damage as far as possible, blood glucose should be optimally controlled through diabetes treatment. Furthermore, all other risk factors that damage the heart, kidneys, blood vessels and eyes must also be treated.



In addition to the treatment of blood glucose, it is important to control blood pressure and cholesterol optimally. It is especially important to stop smoking. Your doctor can help you with this.

Caring for oneself can limit the symptoms of diabetes. Regular examinations, for instance of the heart, eyes and feet, are also important.

HOW IS DIABETES DIAGNOSED?

The blood glucose level is determined to diagnose diabetes. This level is expressed as mg/dl or mmol/l. A further option is the determination of "long-term blood glucose", HbA_{1c} (glycolised haemoglobin). HbA_{1c} reflects average blood glucose over the past two to three months and is also determined in a blood test by your doctor.

The value of glycolised haemoglobin (HbA_{1c}) can be expressed in two ways: as % or mmol/mol.

HbA _{1c} %	4.0	5.0	6.0	6.5	7.0	7.5	8.0	9.0	10.0
HbA _{1c} mmol/mol	20	31	42	48	53	59	64	75	86

The current blood glucose level can also be measured. In this case, the blood glucose content of a drop of blood from the fingertip is determined using a blood glucose meter. This measurement can also be done at home and is useful for therapy adjustment.



The doctor will discuss with you whether blood glucose measurement at home makes sense for you and how it is done.

WHAT DO THE READINGS TELL US?

≥ 126
mg/dl



≥ 126 mg/dl (7 mmol/l)
Blood glucose on an empty stomach measuring a minimum of 126 mg/dl at least twice, or glycosylated haemoglobin above 6.5%, indicates diabetes.

≥ 100
mg/dl



100–125 mg/dl (5.6–6.9 mmol/l)
A measured value of 100–125 mg/dl indicates impaired glucose tolerance. Further checks are necessary.

≥ 70
mg/dl



70–100 mg/dl (3.9–5.6 mmol/l)
In non-diabetics, blood glucose on an empty stomach lies between 70 and 100 mg/dl with an HbA_{1c} below 5.7%.

< 70
mg/dl



< 70 mg/dl (3.9 mmol/l)
Hypoglycaemia: especially in older diabetics, an excessively low blood glucose level can be harmful.

Generally recommended blood glucose levels for type 2 diabetics:

100–125
mg/dl



100–125 mg/dl (5.6–6.9 mmol/l)
Blood glucose on an empty stomach

140–199
mg/dl



140–199 mg/dl (7.8–11.0 mmol/l)
Blood glucose 1–2 hours after a meal

HbA_{1c} target range for well-controlled type 2 diabetes

6.5–7.5
%



6.5%–7.5% (48–59 mmol/mol)
Please discuss your personal target values with your diabetes team.

WHEN IS BLOOD GLUCOSE WELL CONTROLLED IN TYPE 2 DIABETICS?

The individual target value depends on:

- ✓ Duration of diabetes
- ✓ Concomitant diseases
- ✓ Age of patient
- ✓ Type of therapy

References

Deutsche Diabetes Gesellschaft, Nationale VersorgungsLeitlinie Therapie des Typ-2-Diabetes, Long Version, 1st Edition, Version 4, August 2013, last amended November 2014

[Source: German Diabetes Health Report 2017, Link: <https://www.diabetesde.org/pressemitteilung/deutscher-gesundheitsbericht-diabetes-2017-erschiene>]

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