

Scottish International Conference on Multidisciplinary Research and Innovation – SICMRI 2025

THE ROLE OF INSULIN IN DIABETES AND FORMS OF THE DISEASE

Moxinur Maxmudova Ne'matillayevna
Fergana Medical Institute of Public Health
Fergana, Uzbekistan

Abstract: Insulin is the main hormone that regulates carbohydrate, fat, and protein metabolism in the body and plays an important role in maintaining normal blood glucose levels. Diabetes mellitus is a chronic metabolic disease that develops as a result of absolute or relative insulin deficiency, as well as a decrease in tissue sensitivity to insulin. This topic covers the physiological functions of insulin, the mechanisms of its action on glucose metabolism, and the etiological and clinical characteristics of the main forms of diabetes mellitus - type 1, type 2, gestational, and secondary diabetes. The pathophysiological processes associated with insulin deficiency and the importance of correctly differentiating disease forms in diagnostics and treatment are also analyzed. The presented data indicate the need for an individual and comprehensive approach to effective control of diabetes mellitus.

Keywords: insulin, diabetes, glucose metabolism, insulin deficiency, insulin resistance, type 1 diabetes, type 2 diabetes, gestational diabetes.

Diabetes is a metabolic disorder that occurs due to a decrease in insulin levels and an increase in blood sugar. The disease is chronic and often has a risk of exacerbation. Conditions caused by diabetes can be fatal (this is hyperglycemic and hypoglycemic coma). According to statistics, diabetes is the second most common disease caused by metabolic disorders (obesity is in first place). Worldwide, diabetes is diagnosed in one in ten people. Given that the disease can occur without symptoms, scientists assume that the percentage of patients with diabetes is actually much higher.

The importance of insulin - Diabetes mellitus occurs due to insulin deficiency. Disorders in protein, carbohydrate and fat metabolism are characteristic of this disease. Insulin, which is involved in carbohydrate metabolism, ensures the breakdown, synthesis and utilization of glycogen in the liver, and also prevents the breakdown of carbohydrate compounds. In the process of protein metabolism, insulin begins to synthesize proteins and nucleic acids, preventing the breakdown of the former. The effect of insulin on fat metabolism is that it increases the rate of glucose entry into hepatocytes, activates energy cellular processes, slows down the breakdown of fats and improves the synthesis of fatty acids. If insulin is not enough, sodium cannot enter the cells.

Forms of the disease Diabetes mellitus can be mild, moderate and severe in severity. There are four main clinical forms of this disease:

Type 1 diabetes mellitus (insulin-dependent). Occurs in people under 35 years of age and in young children. The natural production of insulin completely stops, so it must be constantly injected.

Type 2 diabetes mellitus (non-insulin-dependent). Occurs in people over forty and fifty years of age, the cause of its occurrence is abnormal sensitivity of tissues to insulin. In this type of diabetes, sugar absorption is difficult, insulin injections are not required.

Symptomatic (secondary) diabetes mellitus. Occurs due to another disease (for example, pancreatic diseases). It can also occur due to long-term use of medications, genetic pathologies.

Diabetes mellitus caused by malnutrition in childhood. Most often occurs in people living in tropical regions.

In addition, gestational diabetes mellitus, which occurs in women during pregnancy, can be distinguished. Depending on the level of glucose in the blood, it is classified as follows:

Scottish International Conference on Multidisciplinary Research and Innovation – SICMRI 2025

Compensated diabetes mellitus - the patient does not complain about his health, the blood sugar level on an empty stomach does not exceed 4 mmol/l, and during the day does not exceed 9 mmol/l.

Subcompensated diabetes mellitus - there are no symptoms, and the blood sugar level is from 8 to 11 mmol/l.

Decompensated diabetes mellitus - the patient complains of poor health, symptoms of the disease are detected, the blood glucose level is above 11 mmol/l.

Insulin is the main regulator of metabolism in the body and is crucial in the development of diabetes mellitus. Studies show that absolute or relative insulin deficiency and tissue resistance to insulin cause various clinical forms of diabetes mellitus. Correct differentiation between type 1, type 2, gestational and secondary forms of diabetes mellitus is important for early diagnosis of the disease, selection of individual treatment tactics and prevention of complications. A deep understanding of the physiological functions of insulin and a comprehensive assessment of the forms of the disease contribute to effective control of diabetes mellitus and improvement of the quality of life of patients.

References

1. Ulugbek, M. (2025). THE IMPORTANCE OF HYGIENIC ASSESSMENT OF THE IMPACT OF ATMOSPHERIC AIR POLLUTION ON PUBLIC HEALTH (ON THE EXAMPLE OF THE CITY OF FERGANA). *SHOKH LIBRARY*, 1(12).
2. Khaydarova, Buzulaykho, et al. "The Association between ambient air pollution and resistant hypertensive disorders in pregnancy: a case-control study in Tashkent." *Revista Latinoamericana de Hipertensión* 20.10 (2025).
3. Jaloldinovich, M. O. (2025, December). UNDERSTANDING HOSPITAL-ACQUIRED INFECTIONS. In *London International Monthly Conference on Multidisciplinary Research and Innovation (LIMCMRI)* (Vol. 3, No. 1, pp. 73-74).
4. Jaloldinovich, M. O. (2025, December). EPIDEMIOLOGY OF HOSPITAL-ACQUIRED INFECTIONS. In *Scottish International Conference on Multidisciplinary Research and Innovation–SICMRI 2025* (Vol. 2, No. 2, pp. 75-76).
5. Jaloldinovich, M. O. (2025, December). FACTORS INFLUENCING THE DEVELOPMENT OF HOSPITAL-ACQUIRED INFECTIONS. In *Scottish International Conference on Multidisciplinary Research and Innovation–SICMRI 2025* (Vol. 2, No. 2, pp. 77-79).
6. Aliyevich, A. A. (2025, December). MODERN APPROACHES TO FORMING THE CORRECT UNDERSTANDING OF AIDS AMONG THE POPULATION. In *London International Monthly Conference on Multidisciplinary Research and Innovation (LIMCMRI)* (Vol. 3, No. 1, pp. 310-312).
7. Aliyevich, A. A. (2025). THE PREVALENCE OF CARDIOVASCULAR DISEASES AND THEIR SOCIO-HYGIENIC IMPORTANCE IN FERGANA REGION. *Shokh Articles Library*, 1(1).
8. Ganiyevich, R. T. (2025, December). FEATURES OF THE COURSE OF COVID-19 IN PATIENTS WITH CONCOMITANT DISEASES. In *London International Monthly Conference on Multidisciplinary Research and Innovation (LIMCMRI)* (Vol. 3, No. 1, pp. 502-503).
9. Ganiyevich, R. T. (2025, December). INFORMATION ABOUT IMMUNODEFICIENCIES. In *Scottish International Conference on Multidisciplinary Research and Innovation–SICMRI 2025* (Vol. 2, No. 2, pp. 92-93).
10. Ganiyevich, R. T. (2025, December). SECONDARY IMMUNODEFICIENCIES: CLINICAL AND LABORATORY DIAGNOSTICS. In *London International Monthly Conference on Multidisciplinary Research and Innovation (LIMCMRI)* (Vol. 3, No. 1, pp. 500-501).

Scottish International Conference on Multidisciplinary Research and Innovation – SICMRI 2025

11. Osbayov, M. (2025). MEDICAL INSTITUTES: THE ROLE OF STATISTICAL DATA IN ORGANIZING SCIENTIFIC RESEARCH WORKS OF STUDENTS. *Journal of Multidisciplinary Sciences and Innovations*, 1(3), 363-366.
12. Imaralievich, M. O. (2025, December). WAYS TO INCREASE THE EFFECTIVENESS OF INTERACTIVE ELECTRONIC TEXTBOOKS IN THE SUBJECT OF HYGIENE AND MEDICAL ECOLOGY. In *London International Monthly Conference on Multidisciplinary Research and Innovation (LIMCMRI)* (Vol. 3, No. 1, pp. 221-223).
13. Imaralievich, M. O. (2025, December). METHODOLOGY FOR IMPROVING THE SOFTWARE SUPPORT OF THE SUBJECT “HYGIENE. MEDICAL ECOLOGY”. In *London International Monthly Conference on Multidisciplinary Research and Innovation (LIMCMRI)* (Vol. 3, No. 1, pp. 218-220).
14. Imaralievich, O. M. (2025). METHODOLOGY FOR APPLYING AI-BASED ANALYTICAL SYSTEMS IN HYGIENE AND MEDICAL ECOLOGY. *Научный Импульс*, 4(39), 403-407.
15. Imaralievich, O. M. (2025). THE ROLE OF MOBILE APPLICATIONS IN DEVELOPING HYGIENIC COMPETENCIES AMONG STUDENTS. *Новости образования: исследование в XXI веке*, 4(40), 184-189.