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THE IMPACT OF ENERGY EXPENDITURE ON THE HUMAN BODY THEIR MODERN SOLUTIONS

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Abstract
According to the World Health Organization's 2022 data, more than 1 billion people — or one in eight — suffer from obesity. Since 1990, this condition has doubled among adults and quadrupled among children. The increase in this indicator is directly related to low energy expenditure and the high consumption of food products. This article discusses how to determine energy expenditure and presents ideas on promoting a healthy lifestyle.

Keywords: Enzymes, cardiovascular diseases, molecular changes, heredity, energy imbalance, diet, diabetes mellitus.

Introduction

Fats primarily serve the functions of providing energy and protecting the body from mechanical impacts. However, in the current context, fats are more involved in energy storage rather than being broken down to release energy. This excessive accumulation of fat leads to disruptions in the physiology of internal organs and contributes to the development of various severe diseases.

Obesity may result from the following pathological factors:

Consumption of foods rich in carbohydrates and fats

Low utilization of fatty acids stored in fat depots, often due to factors that impair fat breakdown

Increased synthesis of fatty acids as a result of excessive carbohydrate intake

Imbalance between caloric intake and energy expenditure

Disruption in hormonal regulation of fat metabolism, particularly due to damage to the hypothalamus, which affects appetite control

Genetic predisposition to obesity: If one or both parents are obese, children are more likely to be predisposed due to inherited genes

Thyroid gland dysfunction: Thyroid hormones regulate general metabolism, and changes in hormone activity can affect metabolic processes
Low insulin activity
Vitamin deficiencies
Alcohol dependence
The conditions listed above are pathologies that can lead to obesity. Most of these conditions can be treated through therapeutic methods. However, such treatments are usually short-term solutions. Even if hormone levels are brought back to normal, without proper control of dietary intake, obesity may reoccur.
Nowadays, many doctors recommend maintaining a balance in the amount of energy provided by organic compounds. They work on normalizing the amount of non-controllable (basal) energy through physical activity and various exercises. This is based on the idea of spending most of the incoming energy and reducing fat accumulation in the body. The energy that is not actively controlled is mainly derived from fat stores. To help calculate energy expenditure, scientists have developed formulas that make energy distribution easier to understand.
Formulas to calculate basal metabolic rate (BMR):
For men:
$(10 \times M) + (6.25 \times H) - (5 \times Age) + 5$
For women:
$(10 \times M) + (6.25 \times H) - (5 \times Age) - 161$
In these formulas:
M stands for body mass in kilograms (kg),
H stands for height in centimeters (cm),
Age is in years.
This formula helps calculate the basal energy expenditure, which is the amount of energy the body uses while at complete rest, without performing any physical labor.
To calculate total energy expenditure, activity level multipliers (coefficients) are used:
1.2 – Sedentary lifestyle (sitting, minimal movement)
1.3 – Light activity
1.6 – Moderate physical activity
1.7 – Intense physical activity
1.9 – Very intense physical activity (heavy labor, athletic training)
By choosing the appropriate coefficient based on one's activity level and multiplying it by the basal energy expenditure, one can determine the total daily energy expenditure.

To find the amount of controllable (active) energy expenditure, subtract the basal energy from the total energy. This value represents the energy derived from physical activity and fat stores. By knowing this value, one can work to prevent obesity more effectively.

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