

peritoneal fluid, which may be a consequence of an increase in NO production by the induced NOS isoform under its stimulation with bacterial antigens, pro-inflammatory cytokines and may be a sign of the nitrosyl stress development. In addition, the development of acute EP was characterized by an increase in the quantity of CEC in the blood as an indicator of damage to the endothelium of blood vessels after half a day – up to 10.6 (10; 11.7) / μl , or 3.4 times ($p < 0.001$), after 1 day – up to 20.6 (19.4; 21.7)/ μl , or 6.6 times ($p < 0.001$), after 3 days – up to 19.7 (19.4; 21.1)/ μl , or by 6.4 times ($p < 0.001$) compared with the value in the control – 3.1 (2.2; 4.2)/ μl . The increase in the number of CEC in the blood of rats with EP can be caused by “bacterial aggression” and formation of reactive nitrogen and oxygen species with damage to the basal membrane of blood vessels and disconnection of endothelial cells from it.

Выводы. The obtained data on the study of changes in the body of rats with acute experimental peritonitis indicate damage to the vascular endothelium, which may be as a consequence of microcirculation disorders under significant increase in the activity of the inducible NOS isoform and the production of excess NO concentrations.

ЛИТЕРАТУРА

1. Maksimovich, N. Ye. Amino acid L-arginine and prospects for its use in clinical practice / N. E. Maksimovich, D. A. Maslakov // Zdravookhranenie. – 2003. – № 5. – P. 35-37.
2. Lazarenko, V. A. Experimental model of widespread fecal peritonitis / V. A. Lazarenko [et al.] // Kursk scientific-practical. West. "Man and his health". – 2008. – № 4. – P. 128-132.
3. Measurement of nitrate and nitrite in biological samples using nitrate reductase and Griess reaction / D. L. Granger [et al.] // Methods Enzymol. – 1996. – Vol. 268. – P. 142-151.
4. Rice-Evans, C. A. Laboratory techniques in biochemistry and molecular biology: techniques in free radical research / C. A. Rice-Evans. – London : Elsevier, 1991. – 291 p.

COMPUTATIONAL METHOD FOR CONSTRUCTING INDIVIDUALLY ACCEPTABLE DIET USING MS EXCEL SOLVER

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Актуальность. Human health is largely determined by nutrition. A balanced menu is a very important component of a healthy diet. Quick and correct calculations of an energetically optimal diet that provides the daily nutrient requirements, taking into account the individual characteristics of the body and a particular individual preferences, is a problem of current interest.

Цель. Calculate the individual required daily calorie intake, taking into account gender, weight, height, age, and physical activity of a person. Solve the problem of an

optimal diet that covers a person's daily need for nutrients (proteins, fats, carbohydrates), vitamins and microelements and reflects a person's individual preferences in choosing certain foods.

Методы исследования. 1. To calculate the value of the basic metabolism (in kcal), the Harris-Benedict formula was used, the coefficient of physical activity of a person was taken into account to determine the value of the total metabolism.

2. An optimization problem of linear programming was formulated, a mathematical model of the problem was compiled:

a) the variables were determined – the amount of foods preferred by a person (in grams), several popular available types of foods with a known calorie content (in kcal/100g of product) that contain nutrients with known quantities (per 100g of product) were selected;

b) constraints on nutrients (the minimum daily human need for proteins, fats, carbohydrates, vitamins and microelements) in the form of a system of linear inequalities were compiled, the system of inequalities also included constraints on the daily amount of products;

c) the equation of the total caloric intake per day (the objective function) was compiled, the exact value of the objective function was indicated as the results of the calculation of paragraph 1.

3. All calculations were performed in the MS Excel spreadsheet environment. To find the optimization problem solution Excel Solver Add-in was used.

Результаты и их обсуждение. The results of calculating the required total daily energy expenditure for two students, male and female, was obtained, taking into account body weight, height and age, and moderate physical activity. The problem of linear programming was solved, an individual balanced diet was compiled from products chosen by the students. In the case of impossibility to satisfy all constraints and obtain the particular value of the objective function, the diet was improved by purposeful introducing a product containing a larger or smaller amount of a nutrient, the lack of which did not allow optimizing the solution.

Выводы. The work shows the wide possibilities of using mathematical optimization methods when solving them in MS Excel spreadsheet. The proposed method of an optimal diet computing can be useful to a dietitian in the selection of an individual specialized diet for a particular patient. It can also be used by anyone who decides to implement the principle of healthy eating when choosing their diet.

ЛИТЕРАТУРА

1. Палий, И. А. Линейное программирование. Учебное пособие / И. А. Палий. – М.: Эксмо, 2008. – 256 с.
2. Таламанова, М. Н. Физиология обмена веществ. Учебно-методическое пособие / М. Н. Таламанова, Е. В. Крылова, А. В. Дерюгина. – Нижний Новгород: Нижегородский госуниверситет, 2019.- 31 с.