

INFLUENCE OF ENERGY DRINKS ON SOME BIOCHEMICAL PARAMETERS OF BLOOD

Sharipova Madina Akramovna

Bukhara State Medical Institute, Bukhara, Republic of Uzbekistan

Annotation: *The aim of the study was to study the effect of energy drinks on a number of biochemical parameters of the body after their use for 21 days. The urgency of the problem is connected with the need to study the mechanism of influence on the metabolism of energy drinks that are widely used at the present time. The study was conducted on volunteers. Biochemical analyses were carried out on the basis of a scientific and educational laboratory. Significant changes in the level of low-density lipoproteins (LDL), triacylglycerols (TAG), calcium ions and triiodothyronine (T3) were detected. It is suggested that the mechanism of stimulating effect of energy drinks and their ambiguous effect on metabolism is observed: an increase in the level of T3 and calcium ions, a decrease in TAG and LDL are noted.*

Key words: *energy drinks, thyroid hormones, triacylglycerols.*

In Russia, "energy" drinks are currently gaining great popularity [6]. The widespread use of EN is explained not only by their taste qualities, but also by the subjective assessment of those who drink them, i.e., an increase in working capacity for a certain period after taking EN, lack of drowsiness, euphoria, etc. [6, 7]. Recently, many people believe that the use of EN has a detrimental effect on both the state of organ systems and the mental component of a person [8]. Many people enjoy using EN. At the same time, there is an insufficient amount of research on the effects of energy drinks on metabolism. Our research is relevant because of the popularity of EN among young people, the widespread use of EN from educational organizations to night clubs and bars. EN is mixed with alcohol, which leads not only to a tonic effect of EN, but also to a depressing effect on the central nervous system (CNS), since alcohol and EN are antagonists. Some countries, after studying the composition of EN, have added them to the list of medicines and only sell them in pharmacies [6]. In this regard, the aim of our work was to determine the effect of energy drinks on a number of biochemical parameters of blood and to interpret the data obtained with the identification of a possible mechanism of action of EN on the human body. To achieve this goal, we determined such indicators in the blood serum as cortisol, T3, T4, cholesterol, LDL, HDL, triacylglycerols, calcium and iron ions after using energy drinks for 21 days.

Part investigated number of subjects: Gender distribution – no. 1) The study period is 2 weeks 2) 140 +/- cans of energetika "Flesh" 250ml 3) 120+ / - vacutainers 4) 240+ / -

Age of the subjects: from 20 to 25, because we believe that it is people of this age who use EN most often. Data analysis and monitoring were performed using a Cobas Integra biochemical analyzer on the basis of a scientific and educational laboratory. We made two samples: control data and post-study data. The significance of differences between the two groups was determined by the paired parametric Student's t-test [5]. For the correctness of the statistical analysis, the samples were previously checked for the normality of

the distribution (using the method Schapiro-Wilkie) [4], since the Student's t-test is aimed at estimating differences in the average values of two samples that are distributed according to the normal law. One of the main advantages of the criterion is the breadth of its application. It can be used to compare the average of dependent (related) and independent (unrelated) samples, and the samples may not be equal in size. The Student's method can be used to test the hypothesis of a difference in mean values only for two small groups. Dependent samples are samples that consist of the same objects that are observed under different conditions, for example, before and after some exposure, or during the height of the disease and on the 3rd, 9th, etc. days of the study. Due to the pairwise nature of the data, the two samples must have the same volume n . In our case, the samples are low-volume ($n=10$) and dependent, and for this reason, the Student's paired t-test is used.

About reasoning the results. The results are shown in H_0 : the average values of the two groups are equal to each other, there are no differences. H_1 : the average values of the two groups are not equal to each other, there are differences.

Hypothesis testing is carried out on the basis of the results of the conducted statistical criterion. The results of the reliability of differences in the average values for individual biochemical parameters according to the Student's criterion are shown in Table.2. The decision to reject and accept the statistical null hypothesis is made based on sample data. The applied criterion allows you to find the probability that both averages belong to the same population. If the probability p is below the significance level ($p < 0.05$), which corresponds to the probability of an error-free forecast, the null hypothesis is rejected, the difference should be considered reliable (significant), i.e. due to the influence of some factor, which will also occur in the general population. From this, according to the conducted studies, it follows that the significance of differences in such indicators as cortisol, T4, cholesterol, HDL, iron are not statistically significant. The significance of differences in T3, LDL, TAG, and calcium is valid. It is safe to say that the concentration of the latter components in the blood varies. Thyroid hormones are essential for normal growth and development of the body. They control the formation of heat, the rate of oxygen uptake, are involved in maintaining normal function of the respiratory center, exert inotropic and chronotropic effects on the heart, increase the number of beta-adrenergic receptors in heart muscle, skeletal muscle, adipose tissue and lymphocytes, increase the formation of erythropoietin and increase erythropoiesis, stimulate motility of the gastrointestinal tract, stimulate the synthesis of many structural proteins in the body [1, 2]. In our work, a significant increase in T3 was shown.

Indicators Under the action of T3, the synthesis of oxidoreductases, and $\text{Na}^+ - \text{K}^+ - \text{ATPASE}$ increases, so redox reactions are accelerated, oxygen consumption by tissues increases, aerobic oxidation increases, ATP production increases (calorogenic effect), and the number and size of mitochondria increases [3]. At the same time, nervous system excitation and tachycardia are observed [1, 13]. Thyroid hormones increase fatty acid oxidation, gluconeogenesis, aerobic glucose oxidation, and synthesis, and trigger activation of the initial stages of purine and pyrimidine synthesis [3, 12, and 13]. We did not detect an increase in T4, glucose levels and a decrease in cholesterol in the blood, so it is illegal to draw a conclusion about the development of thyrotoxicosis. Apparently, there is a short-term stimulation of biological functions based on the induction of the body's energy under the influence of T3. However, a significant increase in T3 attracts attention and requires further research in this direction in conjunction with the study of TSH, since any significant change in the hormonal status of the body's system, which can negatively affect the long-term use of EN. Increased calcium levels can be linked to two mechanisms. The first mechanism is the leaching of calcium from bone tissue, which leads to osteoporosis. However, we did not conduct a study of the level of parathyroid hormone and vitamin D3 to conclude in favor of this mechanism. If hyperparathyroidism is detected, it would be reasonable to think about the stimulating effect of parathyroid hormone on the induction of hyperlipoproteinemia and the counterinsular effect of EN, as well as their

negative effect on spermatogenesis [1,2,6,8]. The second mechanism may be associated with stimulation of liver EN alpha-hydroxylase, since the metabolism of substances present in EN requires activation of the monooxygenase detoxification pathway [3]. In turn, activation of this enzyme leads to an increase in the formation of calcitriol, which increases the absorption of calcium from the intestine into the blood. In this case, an increase in calcium can be considered as a positive reaction to the introduction of EN. It follows from the above that it is necessary to continue the study of these parameters when using EN, adding them to the definition of thyroid-stimulating hormone, free fatty acids, parathyroid hormone, calcitriol, inorganic phosphorus, magnesium. The decrease in LDL and triglycerides in the blood serum observed after the use of energy drinks for 13 days can be considered as a positive trend, but it requires further studies at different times with a complete serum lipidogram to talk about the anti-atherogenic effect of energy drinks.

Inepisodes

- 1) Under the influence of EN, an increase in T3 and, as a result, an increase in oxidative processes in tissues, accompanied by the supply of ATP to the brain, which is perceived by the body as a positive stimulus;
- 2) An increase in blood calcium can play a positive role in the aspect of structural adjustment (mineralization) of bone tissue, provided that the level of vitamin D3 and parathyroid hormone is studied.
- 3) Under the influence of energy drinks, a decrease in LDL and TAG was observed 14 days after their use, which may indicate an anti-atherogenic effect of energy drinks, but for a final conclusion on this point, further research is required at different times with a complete blood serum lipidogram.

Literature

1. John F. Laycock, Peter G. Weiss. *Osnovy endocrinologii* [Fundamentals of Endocrinology], Moscow: Meditsina Publ., 2000 (translated from English).
2. *Clinical Endocrinology: A Guide* / Pod. Edited by N. T. Starkova, Moscow: Meditsina Publ., 1991, 512 p.
3. Kolman Ya. Rem K.-G. *Visual biochemistry*: Translated from German-M.: Mir, 2000. - 469 p.
4. Normality of the Shapiro distribution-Wilco [Electronic resource] Access mode: http://life-prog.ru/1_4845_kriteriyashapiro_uilki.html
5. Parametric Student's T-criterion [Electronic resource] Access mode: <http://citoweb.yspu.org/link1/metod/met125/node32.html>, YAGPU, Department of Educational Information Technologies, 26.07.2010.
6. Polyak T. [Electronic resource] Access mode: http://health.passion.ru/pravilnoe-pitanie_poleznye-napitki/energeticheskie-napitki-vredilipolza.htm
7. Energy drinks [Electronic resource] Access mode: <http://www.home-club.kz/node/18465>
8. Energy drinks [Electronic resource] Available at: <URL> <http://bookes.ru/20->
8. Khodzhaeva D. I. Changes in the Vertebral Column and Thoracic Spine cells after Postponement of Mastectomy // *International Journal of Innovative Analyses and Emerging Technology*. – 2021. – T. 1. – №. 4. – С. 109-113.
9. Ilkhomovna K. D. Modern Look of Facial Skin Cancer // *Барқарорлик ва Етакчи Тадқиқотлар онлайн илмий журналі*. – 2021. – Т. 1. – №. 1. – С. 85-89.

10. Ilkhomovna K. D. Morphological Features of Tumor in Different Treatment Options for Patients with Locally Advanced Breast Cancer //International Journal of Innovative Analyses and Emerging Technology. – 2021. – Т. 1. – №. 2. – С. 4-5.
11. Khodjajeva D. I. MORPHOLOGY OF IDIOPATHIC SCOLIOSIS BASED ON SEGMENT BY SEGMENT ASSESSMENT OF SPINAL COLUMN DEFORMITY //Scientific progress. – 2022. – Т. 3. – №. 1. – С. 208-215.
12. Ходжаева Д. И. СОВРЕМЕННЫЕ ВОЗМОЖНОСТИ УЛЬТРАЗВУКОВОЙ ДИАГНОСТИКИ ПРИ РАКЕ КОЖИ ЛИЦА //Жизнеобеспечение при критических состояниях. – 2019. – С. 111-112.
13. Aslonov S. G. et al. Modern Approaches to Oropharyngeal Cancer Therapy //International Journal of Discoveries and Innovations in Applied Sciences. – 2021. – Т. 1. – №. 3. – С. 38-39.
14. Khodjaeva D. I. MAGNETIC-RESONANCE IMAGING IN THE DIAGNOSIS OF BREAST CANCER AND ITS METASTASIS TO THE SPINAL COLUMN //Scientific progress. – 2021. – Т. 2. – №. 6. – С. 540-547.
15. Харибова Е. А., Тешаев Ш. Ж. Морфофункциональные особенности тканевой организации энтероэндокринных клеток в возрастном аспекте //Проблемы биологии и медицины. – 2020. – №. 2. – С. 168-173.
16. Харибова Е. А. Особенности морфологии нейрональных ансамблей в тройничном узле человека //Морфология. – 2011. – Т. 140. – №. 5. – С. 123-124.
17. Achilova, D. N., et al. "Clinical, immunological and medico-social aspects of allergic diseases in children." AnnalsoftheRomanianSocietyforCellBiology (2021): 6736-6740.
18. Achilova, D. N. "SPECIFIC COURSE OF ALLERGIC REACTIONS IN CHILDREN." WebofScientist: InternationalScientificResearchJournal 2.09 (2021): 10-17.