Mini Review

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# Physiological mechanisms of influence of table and treatment mineral waters based on the balgeneological measure "Magnesium Oil" on some systems of health organism in experiment

## Summary

The mini-review is devoted to modern ideas about the biological role of magnesium, the problem of its lack in the human body, and the experimental substantiation of the possibility of using mineral waters with different magnesium concentrations, obtained by diluting the balneological preparation "Magnesium Oil" (BAMO) for the purpose of improving and preventing numerous diseases in clinical practice associated with magnesium deficiency. The use of drinking water based on the BAMO leads to an improvement in the emotional state of the animals and a decrease in emotional stress. MW based on the BAMO with a magnesium concentration of 2.0g/l and 4.0g/l have a sedative effect on the emotional state of the animals and excitatory - on the individual indicators of the CNS. Mineral waters with different concentrations of magnesium exhibit different biological activity, the nature and characteristics of which make it possible to use them for medicinal purposes.

**Keywords:** mineral waters, magnesium, central nervous system, kidneys

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## Mini review

Since the first systems that suffer from adverse (stress) influences are systems for regulating life processes, then the healing of the human body begins with the restoration of their activities in the process of applying natural therapeutic resources (NTR), such as drinking medical-table or therapeutic mineral waters (MW), peloids, clays, preparations on their basis, etc.[1] Restoration of regulation ensures normalization of the functioning of the damaged system (central nervous system, gastrointestinal tract, etc.), which increases the adaptability of the whole organism, and thus provides for its recovery.[2] It should be noted that most diseases and pathological conditions are due to magnesium deficiency, but the lack of magnesium is determined by laboratory studies either indirectly or with long (for years) deficiency and manifestation of the disease.[3–5] Moreover, magnesium metabolism disturbances often occur in patients who already suffer from diabetes type 2, arterial hypertension, coronary heart disease, bronchial asthma, while the increase in magnesium deficiency is consistent with the deterioration of the course of the underlying disease and the development of complications.[6,7] Homeopathy of magnesium in the body is a prerequisite for human health. Changing the contents of this macro element is very often combined with ecological, geographical, professional causes and leads to the development of a number of pathological conditions. Modern living standards, elevated levels of acute and especially chronic stress, a diet with predominant content of artificial food and beverages, hypodynamia determine the growth of the prevalence of cardiovascular diseases, obesity, diabetes mellitus (DM) type 2, and create the problem of chronic deficiency of magnesium in the body. Already in the beginning of 2000 millennia there was a convincing evidence base for the prevalence of the lack of magnesium - according to research by Schimatschek HF[8] which included 16 thousand people, the prevalence of hypomagnesemia in the general population is 14.5%, and a suboptimal magnesium level was found in 33.7%.[8] Given the above, the problem of restoring magnesium balance in the body is important, and the search and development of tools (which include NTR) that are capable of influencing this process is promising and relevant.

Purpose to conduct a complex experimental evaluation of the influence of internal use of drinking water on the basis of the balneotherapeutic agent "Magnesium Oil" (BAMO) with a concentration of magnesium 0.5g/l, medical-table water on the basis of BAMO with a magnesium concentration of 2.0g/l, and 4.0g/l on the body of healthy rats. The experiment was conducted on white male rats of the Vistar line of outbred breeding. Experimental studies were conducted in accordance with the rules established by the Directive of the European Parliament and the Council (2010/63/EU), and methodical recommendations.[9,10] The functional state of the kidneys was assessed by the state of the function of urine formation (glomerular filtration rate, tubular reabsorption, diuresis daily), excretory function (for excretion of creatinine, urea and chlorides), and studies of the functional state of the central nervous system (CNS) and the autonomic nervous system by the method of "open field"; investigated the effect on the indices of the immune system.[11,12] Morphological and histological investigations of internal organs were also performed. The balneological product "Magnesium oil" is a strong brine with a total salinity of 670g/l and a content of magnesium chloride up to 95%, which was diluted with drinking

water to concentrations of magnesium chloride 0.9, 2.0 and 4.0g/l. Animals were divided into 4 groups: 1 - control group and 2, 3, and 4 which received BAMO with a magnesium concentration of 0.9, 2.0 and 4.0g/l, respectively. The rats of all groups received the above mentioned MW on the background of free access to drinking water with tap water intragastric through the probe with metallic olive in the amount of 1% of body weight once a day at the rate of 12 days.

On the basis of the experimental studies, somewhat exciting influence on the functional state of the central nervous system was observed in the use of drinking water on the basis of BAMO and unidirectional, increasing by force of sedative influence on the central nervous system in the application of treatment table water on the basis of BAMO with a concentration of magnesium of 2.0g/l and 4, 0g/l. At the same time, the use of drinking water on the basis of BAMO leads to an improvement in the emotional state of animals (significantly increases the duration of acts of turf) and decrease emotional stress. MW based on BAMO with a concentration of magnesium 2.0g/l and 4.0g/l have a sedative effect on the emotional state of animals and exciting - on separate indicators of the CNS. The use by rats of drinking water on the basis of BAMO leads to stimulation of urine-forming function of the kidneys, which is determined by an increase in the volume of daily diuresis by 74% ($p<0,001$) only due to a significant decrease ($p<0,001$) of the size of tubal reabsorption, which causes an increase in excretion of magnesium on 142% ($p<0.001$). The use of MW with a magnesium concentration of 2.0g /l has no significant effect on the functional state of the kidneys. Under the influence of MW with a magnesium concentration of 4.0g/l, an increase in the volume of dieresis by 50% ($p<0.001$) was established only by increasing the glomerular filtration rate by 23% ($p<0.001$), and magnesium excretion increased by 82% ($p<0.001$). An increase in the excretion of magnesium ions indicates the stimulation of water-electrolyte metabolism and the saturation of the organism with this component. The use of drinking water based on the BAMO causes a mild reaction from the immune system (a slight significant decrease in the percentage of T-lymphocytes.) The use of rats with a magnesium concentration of 2.0 g /l and 4.0 g /l leads to several a greater decrease in the percentage of T-lymphocytes and an increase in the percentage of neutrophils), which corresponds to a typical (physiological) reaction of the organism of healthy rats to the action of the natural factor. . In animals, under the influence of all magnesium-containing waters, the intensification of the biliary excretory function of the liver and the increase in the activity of redox enzymes (succinate dehydrogenase) in the tissues of the organs (heart, stomach, liver and kidneys) studied during histochemical studies were determined.

Thus, the treatment and table waters with different magnesium concentrations, obtained on the basis of the balneological product "Magnesium oil", exhibit biological activity, the nature and characteristics of which provide grounds for predicting the presence of medicinal properties in them. This can be confirmed after conducting experimental studies with the reproduction of certain pathological conditions and, according to the results obtained, was used to develop a clinical trial program.

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## Conflict of interest

The author declares no conflict of interest.

## References

1. Zolotareva TA, Babov KD, Nasibullin BA. Medical rehabilitation. *K*IM. 2012;496.
2. Babov KD, IYa Pinchuk VV. Rehabilitation of victims in conditions of emergencies and hostilities. Post-traumatic stress disorder. Steblyuk Odessa. 2015;240.
3. Durlach J, Nishizawa Y, Morii H. Overview of Magnesium Research: History and Tridents. *New perspectives in magnesium research: nutrition and health H*. London: Springer Verlag; 2007. p. 3–10.
4. Bobkowski W, Nowak A, Durlach J. The importance of magnesium status in the pathophysiology of mitral valve prolapse. *Magnes Res*. 2005;18(1):35–52.
5. Sánchez C, Aranda P, Pérez De La Cruz A, et al. Magnesium and zinc status in patients with chronic renal failure: influence of a nutritional intervention. *Magnes Res*. 2009;22(2)72–80.
6. Sales CH, De F Pedrosa L. Magnesium and diabetes mellitus: their relation. *Clin Nutr*. 2006;25(4):554–562.
7. Gromova OA, Gogoleva IV. The use of magnesium in the mirror of evidence-based medicine and basic research into therapies. *Farmateka*. 2007;146(12):104–110.
8. Schimatschek HF, Rempis R. Prevalens of hypomagnezemia in an unselected German population of 16,000 indivsduals. *Magnes Rez*. 2001;14(4):283–290.
9. Instruction 2010/63/EU of European Parliament and Council on animals used for research and other purposes protection. *Official Journal*. 2010;276:33–79.
10. Kozhemyakin Yu N, Khromov OS, Boldyreva NE, et al. Scientific and practical recommendations for the maintenance of laboratory animals and work with them: monograph. *Interservice*. 2017;182.
11. Order of Ministry of Health of Ukraine: On approval of the methodological recommendations on research methods of biological effects of natural medicinal resources and preformed medicines.
12. Celis ME. Measurement of Grooming Behaviour. In: Celis ME, Torre E, editors. *Methods in Neurosciences*. New York: Academic Press; 1993. p. 359–378.

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