it was immediately centrifugated (4°C for 3.000 × 30 min). For levels of IL-2, IL-4 detection ELISA method was used (Human IL-2 Platinum ELISA and Human IL-4 Platinum ELISA, produced by Affymetrix eBioscience, Austria). TLR-2 in serum was detected by ELISA Kit for TLR-2 (Cloud-Clone Corp). Course of the disease was assessed during 1-year follow-up period of the course of treatment. Frequency and duration of each exacerbation was assessed in points: 0 – without change, 1 – little improvement, 2 – much improvement, 3 – remission/full control.

**Results.** Statistical analysis of the obtained results showed that levels of IL-4 were significantly important only for the frequency of the exacerbations (U= 28,0; p=0,01). Duration of the exacerbation did not differ in children with different levels of IL-4. IL-2 and TLR-2 expression had no association with long-term effects in children who received treatment aimed on the barrier dysfunction correction (p>0,05).

Key words: food allergy, IL-4, epidermal barrier, treatment, emollient.

**STUDY OF THE ACTION OF CHROMIUM-CONTAINING BIOPREPARATIONS FROM SPIRULINA ON INSULIN ACTIVITY IN RATS**

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Trivalent chromium is essential to normal carbohydrate, lipid and protein metabolism. Chromium is biologically active as part of an oligopeptide-- chromodulin – potentiating the effect of insulin by facilitating insulin binding to receptors at the cell surface[1]. In recent decades, the Cr (III) picolinate (CrPic) is used as a nutritional supplement with an effective ability to alleviate the symptoms of type 2 diabetes. On the other hand, CrPic has some disadvantages. In acidic media, when pH is reduced, the complex hydrolyses to release picolinic acid - a determinant factor in the low rate of gastrointestinal absorption of chromium. The results of the research on the toxic effects of CrPic have been reviewed in some publications, while the statements described still bear contradictory characters [2, 3]. In order to exclude the adverse effects of Cr (III) compounds on the human body, the use of chromium-containing natural supplements such as chromium enriched yeasts [4] or high chromium-containing spirulina and other bioactive substances is very important[5, 6, 7]. The goal of present research was study of the effect of new chromium containing preparations from spirulina on insulin activity in rats in experimental alloxanic type II diabetes.

**Materials and Methods.** The spirulina food additive – „SpiruCr1” was obtained with the method previously developed in Scientific Research Laboratory “Phycobiotechnology” [8]. Cyanobacterium Spirulina platensis was grown in presence of chromium glycinate [Cr(Gly)3]Cl (5-30 mg/l) and in both lighting regimes: continuous illumination and with photoperiod 14/10 hours, spirulina productivity and chromium accumulation in biomass were studied. The maximum stimulatory effect of chromium glycinate on productivity of spirulina, as well as chromium accumulation in biomass was established. Chromium glycinate was supplemented portioned in concentrations of 40 mg / l on the first and the 3rd day of cultivation. Cultivation of spirulina was carried out for 10 days with photoperiod regime: night / day (10/14 hours). Biomass was separated from the culture liquid by filtration, washed with distilled water and supposed to lyophilization for obtaining of spirulina food additive, „SpiruCr1”. Injectable preparation „BioRCr1” was obtained from chromium enriched spirulina biomass by extraction and purification [6]. These preparations were tested as remedies for increasing of the insulin activity in rats in experimentally induced type II of diabetes. The research was carried out in RS Laboratory “Human and Animal Ecophysiology”, Institute of Research and Innovation, Moldova State University. The experiments were performed on four groups of rats with average weight 250-300g. 1 – Control group (healthy rats), the second, third and fourth groups included the rats with experimentally induced type II diabetes by administering of alloxan, a chemical substance that causes the destruction of beta- cells of the pancreas - responsible for insulin synthesis. The rats of the third group were fed on a food supplement (SpiruCr1) for 10 days and subsequently their insulin activity has been determined. The fourth group of rats was treated intraperitoneally with the injectable preparation (BioRCr1) for 10 days with testing of insulin activity. Insulin activity was determined by immuno-fermentative method (biochemical analyzer STAT-FAX 4500).

**Results.** The chromium containing products - the food additive (SpiruCr1) and the biopreparation (BioRCr1) are natural, including high content of chromium (up to 10mg/g and 1.2mg/g of Cr, respectively), amino acids, and oligopeptide and other bioactive substances. The effects of chromium containing preparations obtained from chromium enriched spirulina biomass on insulin activity in rats were established. The obtained results are presented in Table 1.

**Table 1. Change in insulin activity in rats following administration of the chromium containing preparations**

<table>
<thead>
<tr>
<th>Experimental groups</th>
<th>Insulin activity, mlU/ml</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Healthy rats (control)</td>
<td>5,00</td>
</tr>
<tr>
<td>2. Rats with alloxanic diabetes</td>
<td>0,27</td>
</tr>
<tr>
<td>3. Rats with alloxanic diabetes treated with „SpiruCr1”</td>
<td>7,80</td>
</tr>
<tr>
<td>4. Rats with alloxanic diabetes treated with „BioRCr1”</td>
<td>7,20</td>
</tr>
</tbody>
</table>

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Both the administration of the food additive «SpiruCr1» and of the biopreparation «BioR(III)Cr1» have induced an increase of insulin activity by 1.44-1.56 times in comparison with control group (healthy rats). We supposed that this fact is due to chromium involvement in the process of increasing insulin activity. Chromium can be part of some oligopeptides—chromodulins—potentiating the effect of insulin by facilitating insulin binding to the cell surface receptors. Thus, the result of research was demonstrated the ability of the chromium containing preparations - «SpiruCr1» and «BioR(III)Cr1» - to stimulate insulin activity.

The prospects for further research. The obtained results demonstrate the positive effect of the chromium-containing bioadditives from spirulina - «SpiruCr1» and «BioR(III)Cr1» on insulin activity in rats. Natural chromium containing preparations obtained by biological synthesis can supplement or substitute synthetic chromium containing food additive with similar action. Further clinical and preclinical investigations are required.

References:


Key words: Spirulina platensis, chromium containing preparations, insulin activity, type II diabetes.

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ANHEDONIA AS BEHAVIORAL MARKER OF EXPERIMENTAL NEUROSIS AND ITS CORRECTION

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Anxious and depressive disorders are widespread nowadays. Number of people who suffer from depression and anxiety permanently increases, in particular, in 2017 about 350 million had depressive disorders and about 260 millions – anxious disorders. Anhedonia is the leading symptom of neurosis, depression, schizophrenia, depersonalization, Parkinson’s disease [1]. Inability to feel pleasure during such abnormal conditions has various character, especially at depressive disorders – positive emotions are not long-lasting which do not ease the patient [2]. The decrease of anhedonia symptoms can define the efficacy of the treatment of such ailments. The aim of the investigation is to investigate indices of anhedonia after experimental neurosis in rats based on the derivative of 2-oxoindoline-3-glyoxylic acid (substance 18).

Materials and Methods. Materials and methods of investigation: experiments are done on rats of Wistar line with body weight 180-230 gr. Animals were kept on traditional nutritional, water and 12-hour light regimen. In order to correct neurosis, derivative of 2-oxoindoline was used. The substance, which was investigated, was taken in 12 mg/kg inside per 1 hour before beginning of stressors influence and every 3 hours during the whole period of neurotization. Chronic neurosis was done by «conflict of afferent activators inside per 1 hour before beginning of stressors influence and every 3 hours during the whole period of neurotization. Chromodulins - chromodulin were used to stimulate insulin activity.

Results. The prospects for further research. The obtained results demonstrate the positive effect of the chromium-containing bioadditives from spirulina - «SpiruCr1» and «BioR(III)Cr1» on insulin activity in rats. Natural chromium containing preparations obtained by biological synthesis can supplement or substitute synthetic chromium containing food additive with similar action. Further clinical and preclinical investigations are required.