

pared with the Enalapril group, the LVEDD and LVESD of the low dose group were significantly increased ($P < 0.01$) and the LVEF and LVFS were decreased ($P < 0.05, P < 0.01$), the LVEDD and LVESD of middle dose group and high dose group were increased no statistical significance ($P > 0.05$), the LVEF and LVFS were decreased no statistical significance ($P > 0.05$). The LVEF and LVFS of high dose group was higher than the low dose group ($P < 0.05$).

2. Qiangxin Capsule Alleviates the Heart Tissue Histologic: The microphotographs showed that in sham group myocardial fibers were arranged orderly, cytoplasmic staining was uniform, and nucleus boundaries were clear. It was observed that in CHF group the range of myocardial cells in heart tissue was in disorder and there is marked neutrophilic infiltration around the myocardial cells. Myocardocyte disarrangement and fibrosis accretion were observed in CHF group as well. In rats group with 4 weeks of treatment with Enalapril or Qiangxin Capsule, myocardocyte disarrangement, neutrophilic infiltration and fibrosis accretion were alleviated compared to rats with Adriamycin.

3. Qiangxin Capsule Attenuates Myocardial Apoptosis in CHF Rats: Compared with the control group, the apoptosis index of the model group was significantly increased ($P < 0.01$). Compared with the model group, the apoptosis index of myocardial cells in each treatment group was decreased, the Enalapril group and middle dose group were significantly decreased ($P < 0.01$). Compared with the western medicine group, the apoptosis index in the low dose group and middle dose group were significantly increased ($P < 0.01$), high dose group were increased no statistical significance ($P > 0.05$). The apoptosis index of high dose group was lower than the low dose group ($P < 0.05$).

4. PERK-eIF2 α pathway in the Heart of chronic heart failure Rats Was Inhibited by Qiangxin Capsule: Compared with the control group, the expression of pERK, p-PERK, eIF2 α , p-eIF2 α , and ATF4 in model group were significantly increased ($P < 0.01$). Compared with the model group, the expression of PERK, p-PERK, eIF2 α , p-eIF2 α and ATF4 in each treatment group were decreased differently ($P < 0.05, P < 0.01$). Compared with the Enalapril group, the low dose group was increased ($P < 0.05$), middle dose group and high dose group were increased no statistical significance ($P > 0.05$). The PERK, p-PERK, p-eIF2 α , ATF4 of high dose group was lower than the low dose group ($P < 0.05$).

CONCLUSION:

1. Qiangxin Capsule could improve the index of echocardiography in CHF rats, reduce LVEDD and LVESD, increase LVEF and LVFS, improve the heart function of CHF rats.

2. Qiangxin Capsule could improve myocardial structure of CHF rats.

3. Qiangxin Capsule could reduce the cardiac muscle cell apoptosis index in CHF rats.

4. Qiangxin Capsule could reduce the GRP78 protein expression and inhibit the related protein expression of PERK-eIF2 α pathway. It also could reduce the accumulation of misfolded proteins, decrease the apoptosis of myocardial cells and delay ventricular remodeling.

Keywords: Chronic Heart Failure; Apoptosis; PERK-eIF2 α pathway; Endoplasmic Reticulum Stress; Qiangxin Capsule

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ELECTRON-MICROSCOPIC LOCALIZATION OF ADENYLATE CYCLASE IN THE RAT TRACHEAL EPITHELIUM DURING COLD EXPOSURE

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Abstract: In this study, a reaction was performed showing the localization and activity of adenylate cyclase in the mucosa of the trachea in normal and prolonged cold exposure to the body. The obtained data on the localization and activity of adenylate cyclase suggest that in intact rats in the mucosa the greatest activity of adenylate cyclase is detected on the surface of the cilia of the single-layered ciliated epithelium and on the surface of the endothelium of the blood capillaries of the submucosa of the trachea. As for the activity of adenylate cyclase in the experiment, a prolonged cold exposure results in a decrease in the intensity of its work.

Key words: Epithelium of rat trachea, adenylate cyclase, cold action.

Material and methods: The study was carried out on 20 white pedigreed adult male rats with a body weight of 150-200 g. In the study, the animals were divided into 2 groups: the first - control consisted of 10 animals, which were kept in the vivarium during the whole experiment at $T = 22^\circ\text{C}$. The second group, consisting of 10 animals, was exposed to a daily 3-hour total cold exposure for 28 days at T minus 15°C . The object of our study was the caudal sections of the mucous membrane of Trachea rats. Tissue samples taken were used for the production of semi-thin and ultra-thin sections. To do this, from the caudal part of the trachea, pieces of tissue 1×1 mm were cut out. To study the localization and activity of adenylate cyclase, the method of electronic histochemistry according to Raik et al., (Gaier, G., 1974) was used. The investigation of ultrathin sections was carried out on an electron microscope of the translucent type "Technai G2 Spirit Twin" - Holland.

Results and discussion: In this study, a reaction was performed showing the localization and activity of adenylate cyclase in the mucosa of the trachea in normal and prolonged cold exposure to the body. AC is a transmembrane protein, part

of its polypeptide chain is located on the outer surface of the membrane [K. C. Chaudhary, M. S. Nijjar., 1988] affects the function of cilia of ciliary cells of the epithelium. The obtained data on the localization and activity of the AC allow us to conclude that in intact rats in the mucosa the greatest activity of the adenylate cyclase is found on the surface of the cilia of the single-layered multi-row ciliated epithelium and on the surface of the endothelium of the blood capillaries of the submucosa of the trachea. As for the activity of adenylate cyclase in the experiment, with prolonged cold exposure, the intensity of its work in the ciliated epithelium of the mucosa decreases. Conversely, there is an increase in the activity of the active center on the surface of the endothelium and erythrocytes in the submucous capillary capillaries. Assessing the function of the ciliated epithelium, especially in the situation with cold exposure, it is necessary to pay attention to the concentration of cyclic nucleotides, which determine pathological changes in the mucociliary conveyor.

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THE STUDY OF THE DYNAMICS OF ACIDITY DURING THE FERMENTATION OF THE COMPOSITE MIXTURE

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Abstracts: The article presents the results of studying the effect of arabinogalactan extracted from larch Dauriskaya on the formation of the properties of the fermented milk product. The optimal dose of introducing arabinogalactan into the composite mixture was determined.

Key words: functional food products, probiotic, prebiotic, arabinogalactan, fermented product.

When producing dihydroquercetin from larch, a significant amount of biologically active substances can be obtained as a byproduct. One such biologically active substance is arabinogalactan.

From the middle of the last century domestic and foreign scientists have been studying its structure and properties. Arabinogalactan is found in immunomodulating herbs (Echinacea purpurea, Baptisia tinctoria, Angelica Acutiloba, and Curcuma longa), but the study of the arabinogalactan extracted from larch is of the greatest interest, since it constitutes a significant part of its biomass. The heartwood of some species of larch comprises up to 35% of arabinogalactan [1].

In recent years, the study of the biological activity of arabinogalactan has been intensified. The difference of arabinogalactan from many polysaccharides has been reported in terms of physico-chemical properties such as low viscosity of concentrated aqueous solutions, high solubility in water, resistance to acid environment, thermal and hydrolytic stability, and good dispersing ability [2]. It was found that arabinogalactan has a significant membranotropic and antimicrobial action against certain bacteria as well as immunomodulating property [3, 4] and antimutagenic activity [4].

The prebiotic ability is of particular interest in studying the properties of arabinogalactan. The results of studies of foreign and domestic scientists show the effect of larch arabinogalactan as a nutrient medium for Lactobacilli and Bifidobacteria since it is a fermentable fiber.

Arabinogalactan serves as food to beneficial symbiotic bacteria in the colon. In turn it helps to reduce the growth of pathogenic bacteria [1, 5, 7, 6].

Over the past few years because of its multifunction properties arabinogalactan has been aggressively introduced in the production of dietary supplements and foods. Thanks to the dispersing ability it is relevant to use arabinogalactan in the development of formulas of yogurt, juices, pastries, confectionery, powdered milk, and other foods rich in mineral supplements and vitamin complexes.

Arabinogalactan mixes well with all kinds of food and does not affect the organoleptic properties of the finished product. It is a source of dietary fiber and has a positive impact on the gastrointestinal tract. It can be recommended as a nutraceutical or functional food supplement in the human diet [8].

Based on the above, studies were carried out in order to assess the possibility of using arabinogalactan extracted from the larch as a functional ingredient adding probiotic and prebiotic properties, improving traditional technologies, intensifying the process of fermentation of soy milk mixture, improving physical, chemical, and organoleptic properties, and microbiological parameters of the fermented milk product.

In the course of work the effect of the portion of arabinogalactan extracted from the larch on the formation of qualitative properties of the fermented milk product was investigated, in particular on the dynamics of titratable acidity.