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Contents

EFFECT OF NANOCERIA ON THE PROTEIN SYNTHESIS FUNCTION IN SALIVARY GLANDS UNDER MONOSODIUM GLUTAMATE-INDUCED OBESITY

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Obesity is associated with hyposalivation, development of xerostomia, increased viscosity of saliva. However, pathogenetic mechanisms of changes in salivary glands under the experimental obesity has not yet been completely elucidated and the ability to correct these changes with nanoceria.

The aim of the study was to investigate the influence of nanoceria on the activity of α-amylase and ornithine decarboxylase (ODC) in the tissues of salivary glands in monosodium glutamate (MSG)-induced obese rats.

The study was carried out on 48 rats of both genders. The animals were divided into four groups: I – intact control (4-month rats), group II – newborn rats subcutaneously in the volume of 4 mg/g MSG administered at 2, 4, 6, 8, 10 day of life, group III – intragastric administration of nanocrystalline cerium dioxide at a dose of 1 mg/kg volume of 2.9 ml/kg against the background of glutamate-induced obesity, the fourth group of animals treated with a solution of sodium citrate intragastrically in the volume of 2.9 ml/kg (solvent of nanocrystalline cerium). Introduction of nanocrystalline cerium dioxide solution starting from 4 weeks after birth (after weaning from the mother) and continued intermittently two-week course in 2 weeks.

The changes in a body weight were analyzed in rats of all groups during 4 months. Body mass index was calculated. Four-month-old animals were decapitated, removed and weighed visceral fat was measured. We determined α-amylase activity and ornithine decarboxylase activity in the homogenate of salivary glands.

We observed the development of visceral obesity in 4-month MSG rats ($P < 0.001$). We established the decrease of visceral obesity under intragastric administration of nanoceria against the background of MSG-induced obesity ($P < 0.05$). It was found a significant 1.06 times decreasing of the activity of α-amylase ($P < 0.05$) and significant 1.47 times decreasing of ODC activity ($P < 0.05$) in MSG-induced obese rats compared with the control group. Under the administration of nanoceria α-amylase activity was significantly increased by 1.09 times ($P < 0.05$) and ODC activity was significantly 1.45 times increased ($P < 0.05$) in salivary glands compared to the group of animals without correction.

Thus, nanocrystalline cerium dioxide administration improves the protein synthesis function in salivary glands under the MSG-induced obesity in rats.