

## ***10.SUMMARY***

Oxidative stress is the process by which the disturbance of the disproportion between the formation and the ability of the enzyme systems to neutralize reactive oxygen species (ROS) causes the increase in their amount in the body. The result of ROS action is damage to protein, lipid structures and genetic material of living cells. Changes in these structures cause disturbances in the proper functioning of the organs and tissues of the human body, including salivary glands.

In dentistry, metronidazole is a drug used in cases of acute periodontitis, acute ulcerative gingivitis; in endodontic treatment of pulp gangrene, in inflammation of bones and joints and in wound infections after surgical procedures. Metronidazole demonstrates antiprotozoal and bactericidal activity against anaerobic microorganisms (*Trichomonas vaginalis*, *Giardia lamblia*, *Entamoeba histolytica*, *Helicobacter pylori*). Treatment with this nitroimidazole derivative should not exceed 10 days. It is associated with many side effects also associated with the state of the oral cavity, for example: candidiasis, metallic taste in the mouth, coated tongue or inflammation of the tongue and mouth. Some of these side effects of metronidazole actions may be related to the effects of the drug on the biochemical systems of the submandibular and parotid glands.

The whey protein concentrate (WPC), obtained by ultrafiltration of whey, contains all necessary, exogenous amino acids (leucine, isoleucine, valine), growth factors or cytokines that regulate inflammatory processes. WPC has antioxidant, antineoplastic, hypotensive, central of Central Nervous System, antibacterial, antiviral, immunomodulatory, anabolic and repairing effects. The beneficial effect of whey proteins on the body is described in the literature mainly in the context of interactions at the skeleton, brain, liver or neoplastic changes. However, there is no information on the effects of WPC on salivary gland tissues or those treated with metronidazole.

There are national reports on changes in the oxidative status of salivary glands after metronidazole. However, there is no information available to prevent such changes. Therefore, the aim of the work is to check how the selected parameters of oxidative stress in submandibular and parotid glands of old, fully developed rats will affect simultaneous administration of the drug and whey protein concentrate.

The research material has been collected in an earlier project in Medical University of Białystok, which obtained the consent of the IKE. The material for examination were

submandibular and parotid glands collected from 24 Wistar rats weighing 350-450 g, divided into 3 groups of 8 individuals each:

group I - control,

group II - metronidazole in a dose of 100 mg / kg for 7 days,

group III - metronidazole in a dose of 100 mg / kg for 7 days with simultaneous administration of WPC-80 0.3 mg / kg for 7 days.

After sampling, the material was placed in a deep freeze in liquid nitrogen, and after 24 hours in a low-temperature freezer at  $-80^{\circ}\text{C}$  until the day of making the determinations. On the day of performing the biochemical determinations, the samples were washed in ice-cold PBS and then weighed. The samples were cut into smaller pieces, suspended in PBS, placed in an ice bath and homogenized in a knife homogenizer. The resulting suspension was sonicated. The homogenates were centrifuged, and the supernatant fluid obtained was used for the study.

Using the colorimetric and immunoenzymatic sets, the following tests were performed:

- total antioxidative capacity (TAS) and total oxidative status (TOS),
- superoxide dismutase 3 (SOD-3) activity,
- catalase (CAT) and peroxidase (GPx) activity,
- reduced glutathione content (GSH) and
- total protein content (PC).

The tests were carried out in duplicates. After performing the experiments on the basis of the obtained results, a selection of tests was made in order to perform statistical analysis.

The results indicated that the administration of only the metronidazole preparation impairs the antioxidant barrier effect of the rat salivary glands in comparison to the control group. However, the association of metronidazole with the whey protein concentrate results in maintaining the antioxidant barrier of the rat salivary glands at the level shown in the control group.

On the obtained results, the following conclusions were formulated:

1. Metronidazole impairs the antioxidant barrier of submandibular and parotid glands.
2. Supplementation with the WPC-80 diet increases the activity and concentration of antioxidants of rat salivary glands.
3. The whey protein concentrate WPC-80 improves the functioning of the antioxidant barrier of the rat salivary glands during metronidazole treatment.