Obesity is currently one of the major health problems in the developed countries and is begging to be a problem in developing countries as well. WHO declared obesity as global health problem. The epidemic of obesity is one of the major challenges for public health. As shown by numerous studies, the only effective form of treatment for people with morbid obesity (BMI> 35 kg / m2), and a chance for permanent weight loss is bariatric surgery. Despite constantly increasing number of patients undergoing this type of surgical procedures, it is still unclear what physiological mechanisms contribute to the effectiveness of this treatment type. For this reason, there are no clear, strict criteria for qualification of individual patient to the appropriate bariatric surgery procedure.

Many studies draw attention to the innervation of the vagus nerve - both ascending and descending - in the physiological regulation of appetite and food intake. A main example is Ghrelin, which is secreted in the gastric mucosa and stimulates the endings of the vagus nerve, which affects the Central Nervous System center of hunger increasing appetite in fasting periods. It is not clear whether other enterohormones,important in the pathophysiology of obesity and its complications: [Glucagon-like peptide-1 (GLP 1),Peptide YY (PYY), Glucose dependent Insulinotropic Peptide(GIP), Cholecystokinin (CCK ) ] have significant influence, by paracrine stimulation of the vagus nerve, on the regulation and control of food intake.

The aim of this research, on the basis of experimental animal model, is to determine what part of the effect of various bariatric procedures is associated with the loss of vagal innervation, as well as what is the effect of vagotomy on the secretion of enterohormones important for regulation of food intake and metabolic regulation of postprandial metabolism. In the experiment we are going to use Wistar rats. Experimental model will be based on animal model of bariatric procedures: sleeve gastrectomy, Roux en Y gastric by-pass (RYGB), intra-gastric balloon insertion and author's modification of RYGB and intra-gastric balloon insertion. In case of the modified RYGB, the procedure will involve intra-gastric balloon insertion, truncal vagotomy and formation of sole gastro-intestinal anastomosis with the Roux loop without creation of the "pouch". The last step of this procedure will be suturing of the pylorus (vag -m RYGB). Modification of the second surgery will be performing additional truncal vagotomy combined with pyloroplasty in order to avoid disturbances of gastric emptying.

After dietetic induction of obesity. Before the surgery, all animals will be fed with a high-calorie diet to induce obesity. Next animals will be weighed and their average calorie intake as well as the number and volume of meals will be determined. During surgical procedure, we will collect samples of venous blood and samples of mucosa of the stomach and small intestine, to assess the tissue enterohormones expression of genes and proteins (Ghrelin, GLP 1,PYY, GIP, CCK) as well as the concentration of these enterohormones in the venous blood. In the postoperative period all animals will be fed with liquid, high-calorie diet for 30 days. During the whole experiment, every 7 days all animals will be observed for total caloric content of meals and the way of food intake (volume and number of food portion). Subsequently, all animals will have a laparotomy, during which venous blood samples as well as the tissue samples of the gastric mucosa of the small intestine from standardized areas will be collected in order to assess short-term effects of the surgery Then 90 days after the surgery all animals will be terminated, and all procedures performed on 30 day of the experiment will be repeated.

The obtained results may help to precize, which elements of the bariatric surgery procedures are the most important in the reduction of appetite, and also what changes in the secretion of the enterohormones, important in the regulation of appetite and metabolism in postprandial period, are caused by those procedures.

In conclusion, the obtained results will significantly expand the knowledge about the role of vagus nerve in the appetite regulation and gastrointestinal physiology.on postoperative function of the body. Additionally, in the future the data could be the basis for further researches for better and more efficient planning of bariatric procedures tailored for the needs of individual patient as well as potential influence on modifications of surgical procedures.