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## Selected parameters of carbohydrate metabolism and adipose tissue activity in patients with lip, oral cavity and pharyngeal cancer

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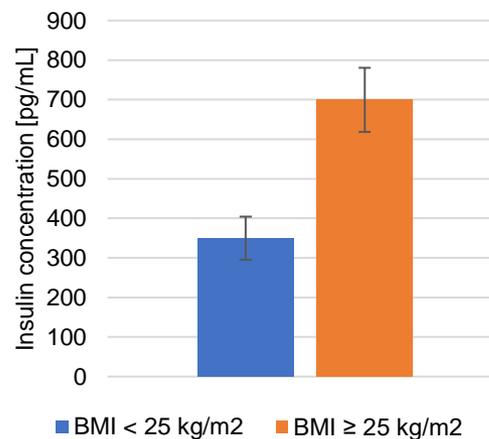
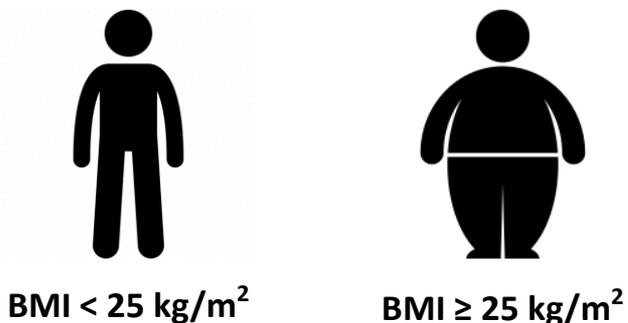
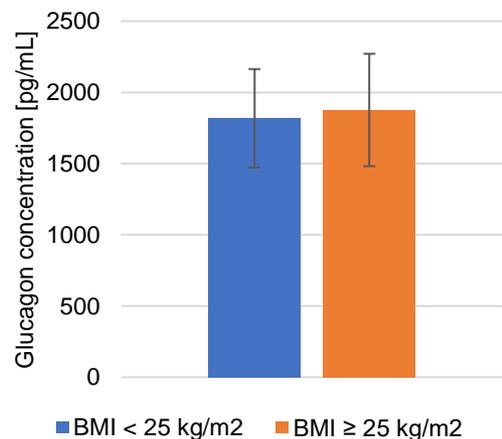
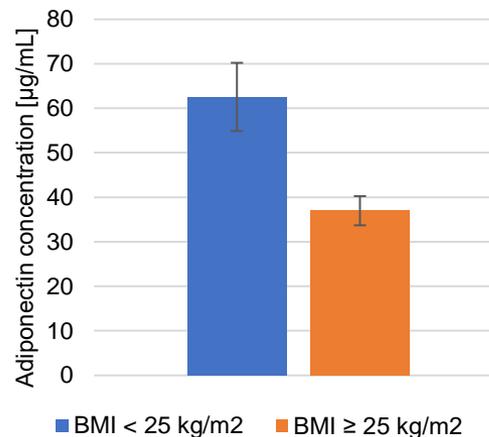
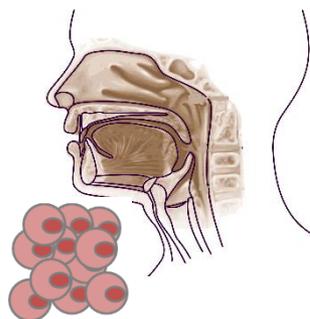
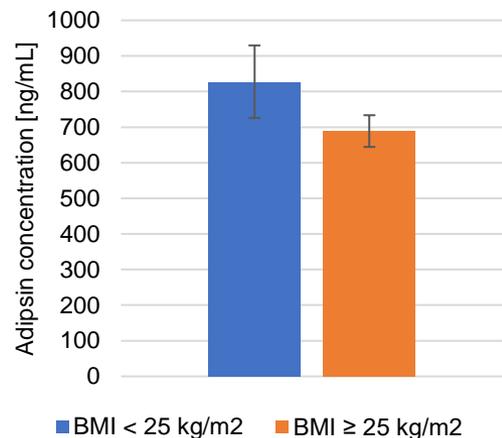
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# Selected parameters of carbohydrate metabolism and adipose tissue activity in patients with lip, oral cavity and pharyngeal cancer



**Abstract:**

Excessive body mass is a factor predisposing to the occurrence of many diseases. In people with a BMI  $\geq 25$  kg/m<sup>2</sup>, a greater amount of adipose tissue, which is an endocrine organ, is found. Adipokines influence lipid and carbohydrate homeostasis. So far, little is known about the effects of increased BMI on parameters related to carbohydrate metabolism and adipokine levels in patients with lip, oral cavity and pharyngeal cancer (LOCP). The aim of the study was to assess the level of adipisin, adiponectin, glucagon and insulin in LOCP cancer patients.

The study group consisted of 40 LOCP patients divided to two groups according to their BMI: 20 subjects with BMI =  $21.46 \pm 0.48$  kg/m<sup>2</sup> (8 females and 12 males, mean age  $64.45 \pm 1.74$  yrs) and 20 subjects with BMI =  $29.43 \pm 0.87$  kg/m<sup>2</sup> (6 females and 14 males, mean age  $64.94 \pm 2.39$  yrs). Blood serum samples were used to perform analysis.  $P < 0.05$  was considered as statistically significant.

A significantly higher concentration of adiponectin was observed in the LOCP patients with normal BMI. In the group of patients with increased BMI, higher level of insulin was observed. There were no statistically significant differences in the concentration of adipisin and glucagon. The obtained results show a significant impact of increased BMI on carbohydrate metabolism and the level of selected adipokines in patients with LOCP cancer. Although obesity is not the main predisposing factor for this group of neoplasms, it may influence the course of the disease.

**Keywords:** adiponectin; adipisin; BMI; cancer; glucagon; insulin; lip, oral cavity and pharyngeal



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# Introduction

- Tumors of the lip, oral cavity and pharynx (LOCP) are a quite rare group of neoplasms - they account for about 6% of all types of cancer.
- LOCP are classified as cancers of the head and neck.
- Excessive body mass associated with the accumulation of significant amounts of adipose tissue leads to a disturbance of carbohydrate metabolism and the endocrine function of adipocytes.
- One of the indicators that allow the diagnosis of overweight and obesity is the body mass index (BMI).
- Normal BMI ranges from 18.5 to 24.9 kg/m<sup>2</sup>.
- Despite numerous studies on obese patients, little is known about the effects of obesity on the course of LOCP.
- The aim of the study is to determine the concentration of adipisin, adiponectin, glucagon and insulin in LOCP cancer patients.



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# Introduction

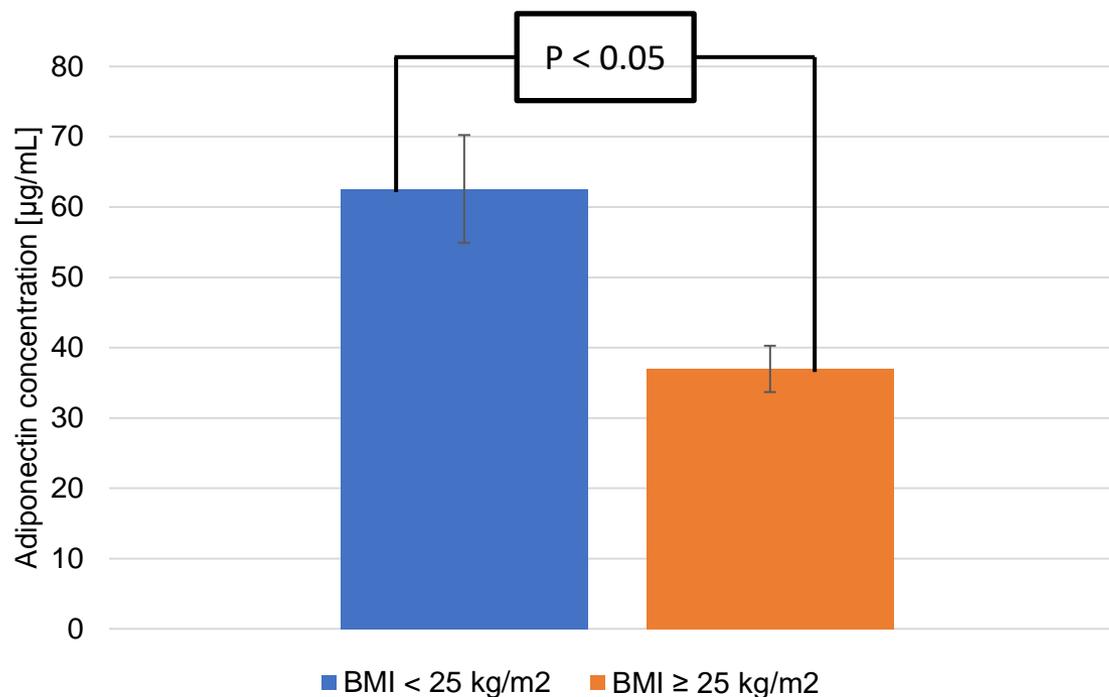
- The study group consisted of 40 patients with LOCP neoplasm divided to two groups according to their BMI.
- Blood serum samples were obtained after collecting venous blood.
- The results were presented as means  $\pm$  SEM.
- $P < 0.05$  was considered as statistically significant.

**Table 1.** Anthropometric characteristic of patients with lip, oral cavity or pharyngeal cancer divided according to their BMI. Each value is mean  $\pm$  SEM.

	BMI < 25 kg/m <sup>2</sup>	BMI $\geq$ 25 kg/m <sup>2</sup>
N	20	20
Sex	8 female and 12 male	6 female and 14 male
Age	64.45 $\pm$ 1.74	64.94 $\pm$ 2.39
Body mass [kg]	59.41 $\pm$ 1.89	87.60 $\pm$ 3.05
Height [cm]	166.15 $\pm$ 1.79	172.45 $\pm$ 1.63
BMI [kg/m <sup>2</sup> ]	21.46 $\pm$ 0.48	29.43 $\pm$ 0.87



# Results and discussion - adiponectin



**Table 2.** Concentration of adiponectin in patients with lip, oral cavity or pharyngeal cancer divided according to their BMI.

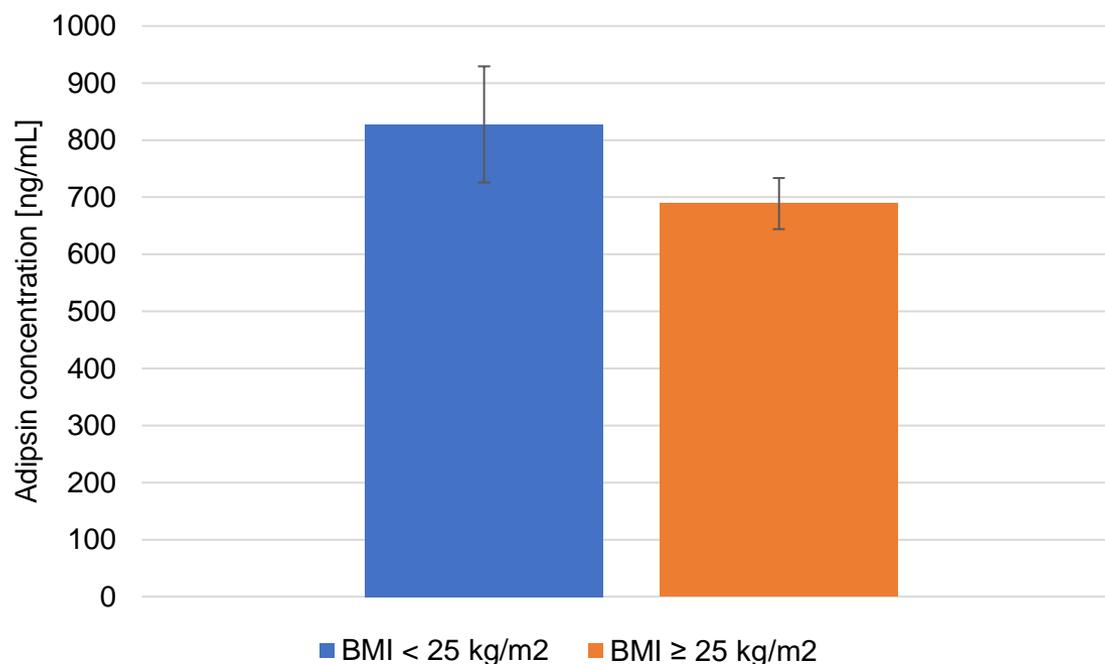
Adiponectin [µg/mL]	BMI < 25 kg/m <sup>2</sup>	BMI ≥ 25 kg/m <sup>2</sup>
Mean	62.571	36.997
SEM	7.664	3.291



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# Results and discussion - adipsin



**Table 3.** Concentration of adipsin in patients with lip, oral cavity or pharyngeal cancer divided according to their BMI.

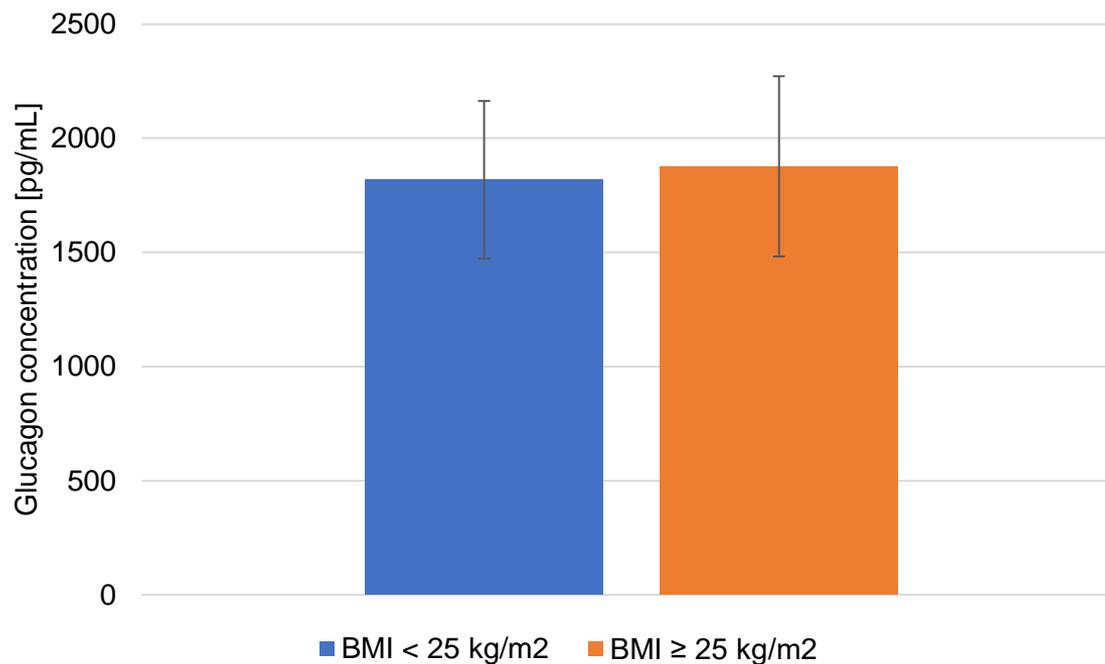
Adipsin [ng/mL]	BMI < 25 kg/m <sup>2</sup>	BMI ≥ 25 kg/m <sup>2</sup>
Mean	827.453	688.989
SEM	101.688	44.699



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# Results and discussion - glucagon



**Table 4.** Concentration of glucagon in patients with lip, oral cavity or pharyngeal cancer divided according to their BMI.

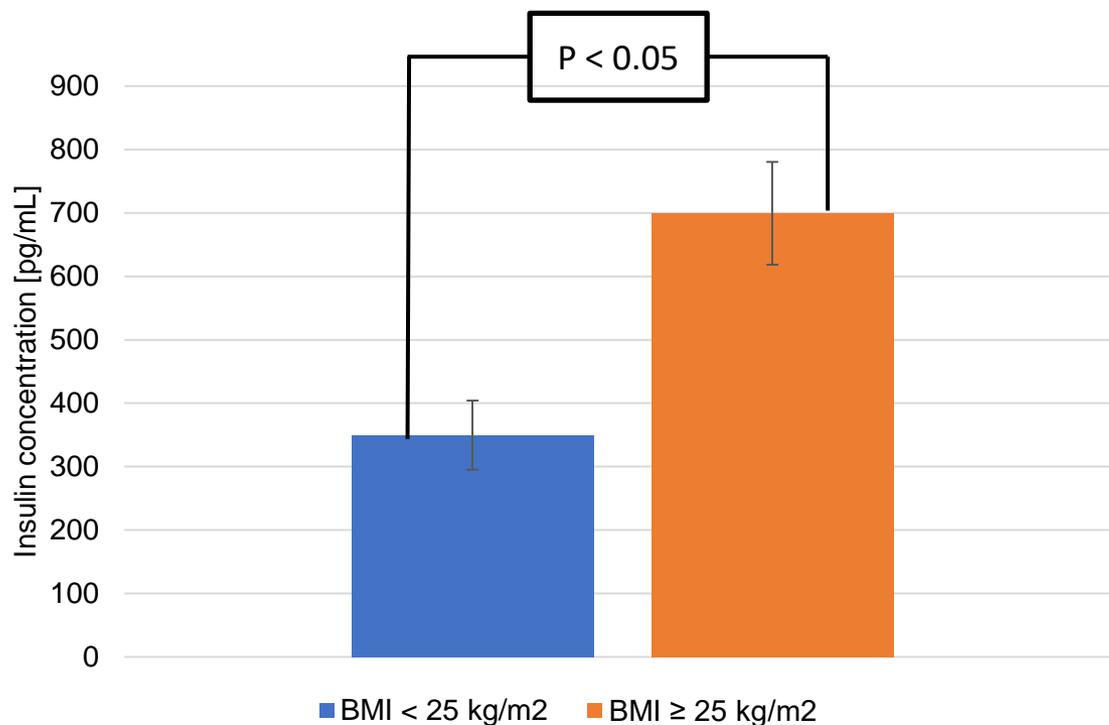
Glucagon [pg/mL]	BMI < 25 kg/m <sup>2</sup>	BMI ≥ 25 kg/m <sup>2</sup>
Mean	1818.066	1877.2018
SEM	345.693	394.614



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## Results and discussion - insulin



**Table 5.** Concentration of insulin in patients with lip, oral cavity or pharyngeal cancer divided according to their BMI.

Insulin [pg/mL]	BMI < 25 kg/m <sup>2</sup>	BMI ≥ 25 kg/m <sup>2</sup>
Mean	349.623	699.396
SEM	54.567	81.245



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# Conclusions

- A statistically higher level of adiponectin was observed in the LOCP group with a normal BMI. In the LOCP group with increased BMI, higher insulin levels were observed.
- In patients with LOCP and increased BMI, similar to people without cancer, a disturbance in the homeostasis of carbohydrate metabolism and the activity of adipose tissue is observed.
- Overdeveloped adipose tissue significantly reduces the synthesis and secretion of adiponectin in patients with LOCP.
- Higher insulin levels in patients with abnormal BMI indicate increasing insulin resistance.



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