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Title: Changes of the Ghrelin/GOAT axis and the mTor pathway in the hypothalamus after sleeve gastrectomy in obese type-2 diabetes rats

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1.What did this study explore?

Our study explored the Changes of the Ghrelin/GOAT axis and the mTor pathway in the hypothalamus after sleeve gastrectomy in obese type-2 diabetes rats. SG can acutely improve obesity and metabolic symptoms. The reduction of ghrelin expression and activation of the mTOR pathway might have opposite effects on food intake after SG.

2.How did the authors perform all experiments?

This study was divided into four parts. First, Zhang W, Shan CX and Tang W designed this research and develop the experimental plan. Second, Wang Q, Rao WS and Song X feed all rats and establish the rat models. Wang Q and Song X measured all the detection index, such as body mass, food intake, OGTT, TG, AG, ghrelin, GOAT and mTOR. Song X was responsible for Elisa, and Wang Q was in charge of Western blot and PCR. We spent 5months in completing all the animal experiment and detection experiment. Third, Wang Q, Song X and Rao WS collected all the data to statistical analysis. Fourth, Wang Q and Zhang W wrote this paper.

3.How did the authors process all experimental data?

Wang Q and Song X collected all the experimental data. Rao WS and Shan CX audited all the data. We kept the data on Microsoft Excel. Data are presented as the mean ± standard deviation (M ± SD). SPSS 20.0was used for statistical analyses, and GraphPad Prism 6.0c was used to edit images. Statistical indicators between the three groups (S0, Sh and SG) were determined by one-way ANOVA, followed by Least Significance Difference (LSD) post hoc comparison. The statistical indicator between two time points in one group was determined by a paired *t*-test, whereas Student's *t*-test was used to compare the means of two independent groups at the same time point.

4.How did the authors deal with the pre-study hypothesis?

Zhang W studied metabolic surgery for many years and put forward the pre-study hypothesis "the ghrelin/GOAT axis in the hypothalamus (via autocrine/paracrine signaling) may be involved in the maintenance of blood glucose concentrations and energy homeostasis by restricting food intake after SG." In this study, we tested this hypothesis and put forward a new hypothesis "altered ghrelin secretion cues might be more important than plasma TG, AG or UAG in SG-induced improvement of obesity and metabolic symptoms."

5.What are the novel findings of this study?

This study found the reduction of ghrelin expression and activation of the mTOR pathway might have opposite effects on food intake after SG.

Sincerely yours

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