The Role of Gastric-Derived GLP-1 Deficiency in Obesity-Induced Appetite Dysregulation

Siqi Wang, Bojun Zhou, Hua Meng

Department of General Surgery and Obesity and Metabolic Disease Center
China–Japan Friendship Hospital

5 September 2024

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PART 01

Research Background

The Role of Gastric-Derived GLP-1 Deficiency in Obesity-Induced Appetite Dysregulation

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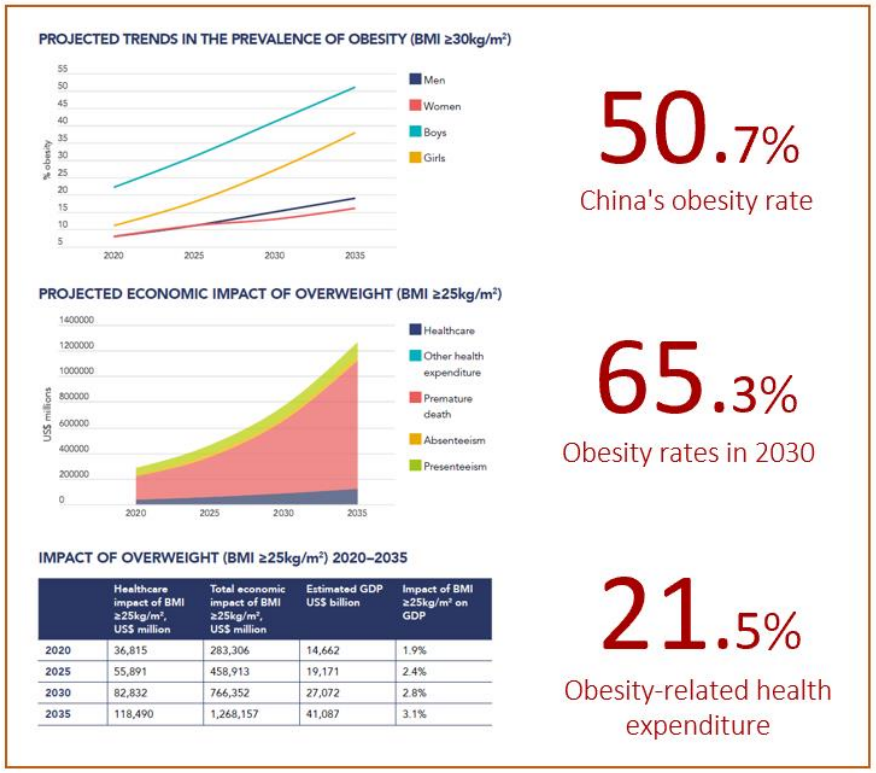
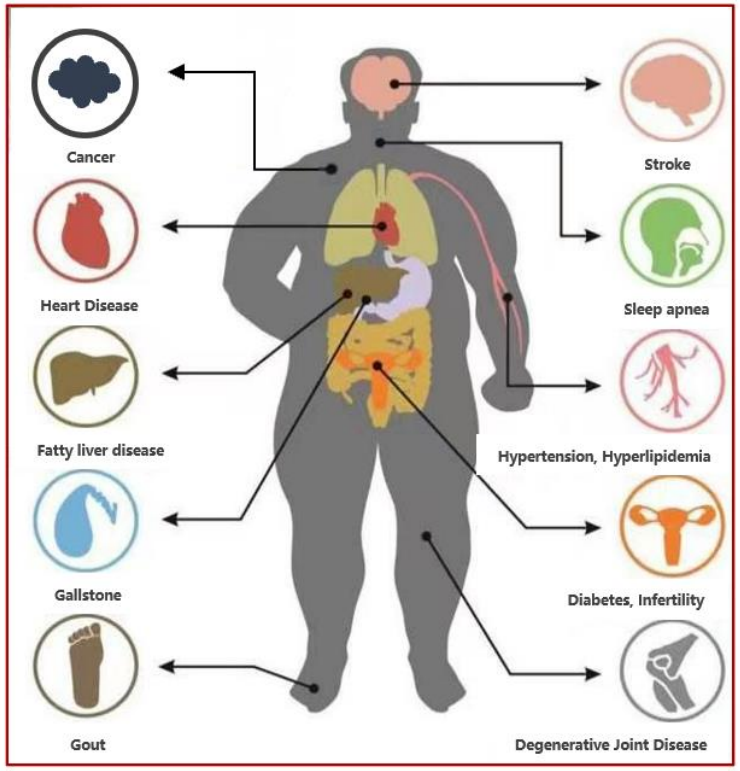
Obesity and related chronic diseases are a major public health problem that seriously endangers the health of the nation



	Healthcare impact of BMI ≥25kg/m², US$ million	Total economic impact of BMI ≥25kg/m², US$ million	Estimated GDP US$ billion	Impact of BMI ≥25kg/m² on GDP
2020	36,815	283,306	14,662	1.9%
2025	55,891	458,913	19,171	2.4%
2030	82,832	766,352	27,072	2.8%
2035	118,490	1,268,157	41,087	3.1%

Serious epidemic



Independent risk factors for chronic diseases

Lancet Diabetes Endocrinol, 2021, 9(6): 373-392.
Lancet Diabetes Endocrinol, 2021, 9(7): 446-461.

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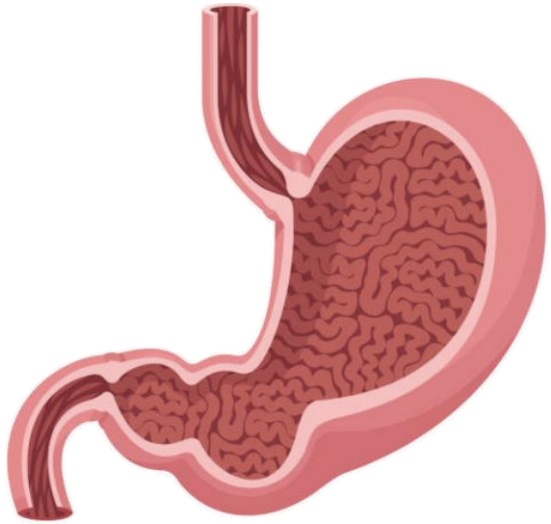
Discovery of GLP-1 in the Stomach

▶ The Stomach as a Novel Organ for GLP-1 Secretion

Recent studies have identified the presence of GLP- 1 positive cells in the stomach;

This discovery opens new avenues for exploring the role of the stomach in metabolic processes;



▶ Rapid Absorption of Gastric GLP-1

Following intragastric glucose injection, GLP-1 can be detected in the gastric veins, rapidly reaching the portal vein;

This rapid absorption suggests that gastric GLP-1 may have a swift impact on metabolic regulation;

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Relationship Between Gastric GLP-1 and Appetite

The Role of Gastric GLP-1 in Appetite Regulation

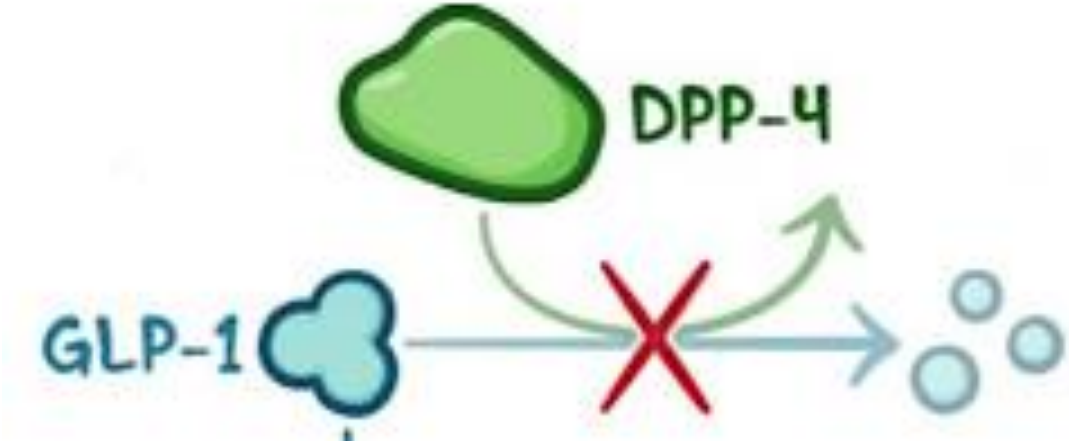
1. The knockout of intestinal GLP-1 dose not impact appetite;

How about gastric-derived GLP-1 in appetite regulation?

2. Easy degradation of GLP-1;

Dipeptidyl peptidase 4 (DPP-4)

The average half-life is only 2 minutes



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PART 02

Research Objective

The Role of Gastric-Derived GLP-1 Deficiency in Obesity-Induced Appetite Dysregulation

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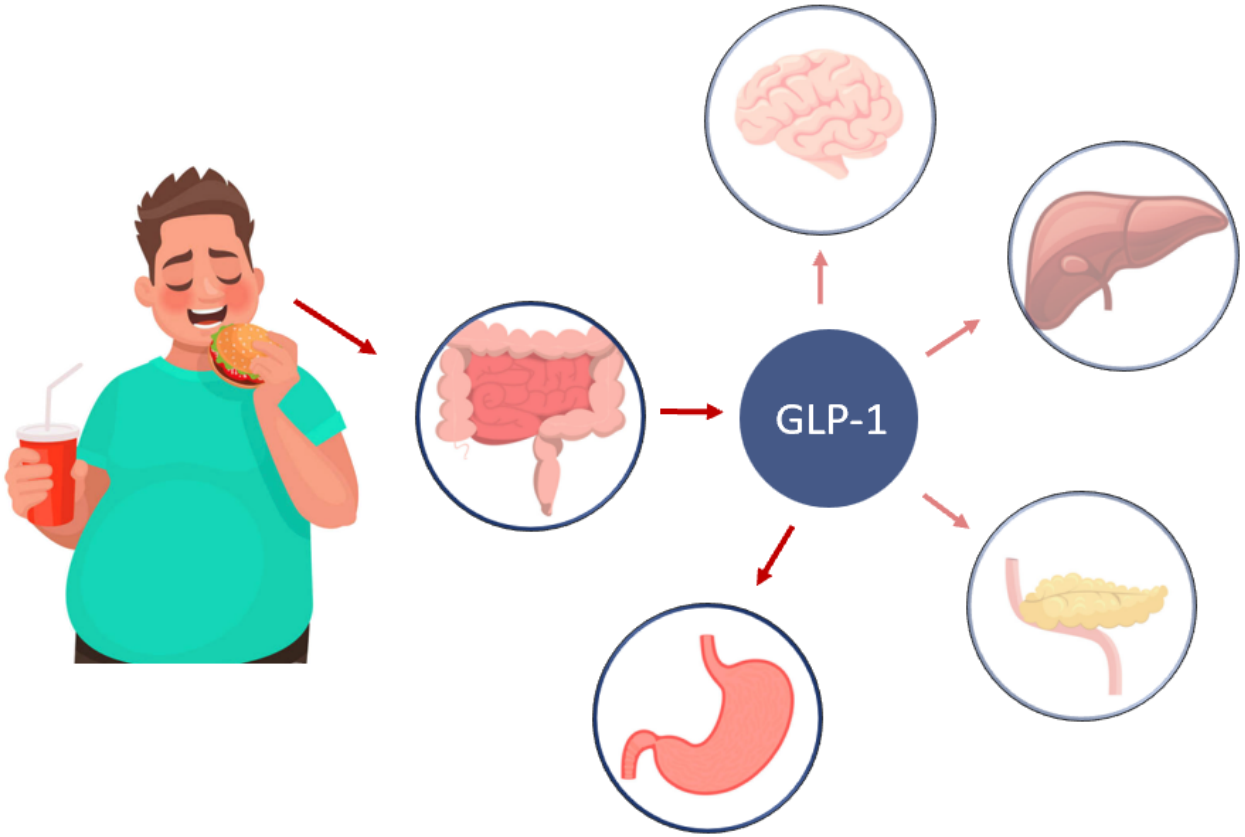
Investigating the Involvement of Gastric GLP-1 in Appetite Modulation



The Potential Role of Gastric GLP-1 in Weight Reduction

To explore whether gastric-derived GLP-1 is involved in the modulation of appetite;

To determine its potential role in weight reduction;

Offering new insights into obesity treatment strategies!

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PART 03

Research Methods

The Role of Gastric-Derived GLP-1 Deficiency in Obesity-Induced Appetite Dysregulation

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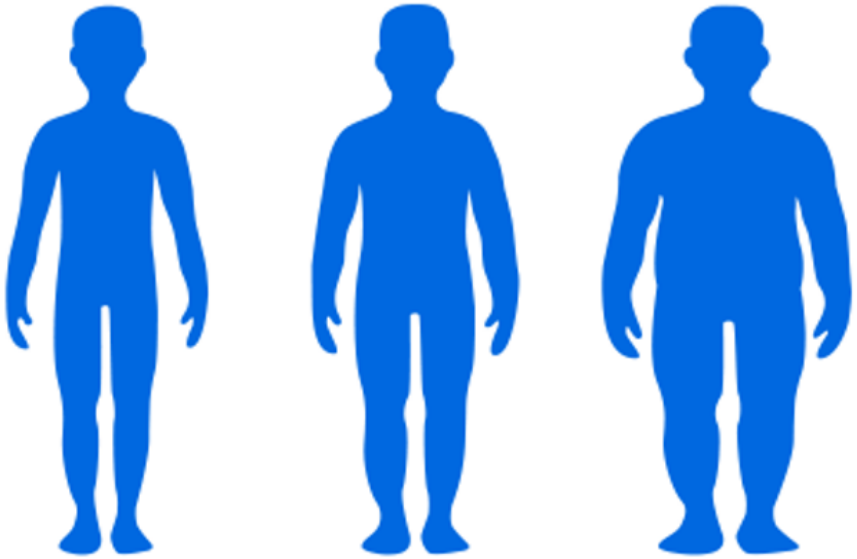
Patient Grouping and Appetite Assessment

Criteria for Patient Grouping

- Patients scheduled for metabolic bariatric surgery



normal | Patient with mild-to-moderate obesity | Patient with severe obesity

Tools for Appetite Assessment

- The Adult Eating Behavior Questionnaire (AEBQ)
- Daily caloric intake

Food Approach Subscales

1. Hunger:

- I often feel so hungry that I have to eat something right away.
- I always seem to be hungry.
- Even if I've just eaten, I often feel like I could eat again.

2. Food Responsiveness:

- If I see or smell food that I like, it makes me want to eat even if I am not hungry.
- If I see others eating, I have to eat too.
- I often feel hungry when I am around other people eating.

3. Emotional Overeating:

- I eat more when I am worried.
- I eat more when I am annoyed.
- I eat more when I am anxious.

4. Enjoyment of Food:

- I love eating.
- I enjoy eating.
- I enjoy eating more than other activities.

Food Avoidance Subscales

5. Satiety Responsiveness:

- I find it difficult to stop eating even when I am full. (Reverse scored)
- I get full very easily.
- I often leave food on my plate at the end of a meal.

6. Emotional Undereating:

- I eat less when I am worried.
- I eat less when I am upset.
- I eat less when I am anxious.

7. Food Fussiness:

- I am very particular about the foods I will eat.
- I am often not keen on trying new foods.
- I have strong likes and dislikes when it comes to food.

8. Slowness in Eating:

- I eat more slowly than others.
- I eat less because I eat slowly.
- I feel full up before finishing a meal.

AEBQ

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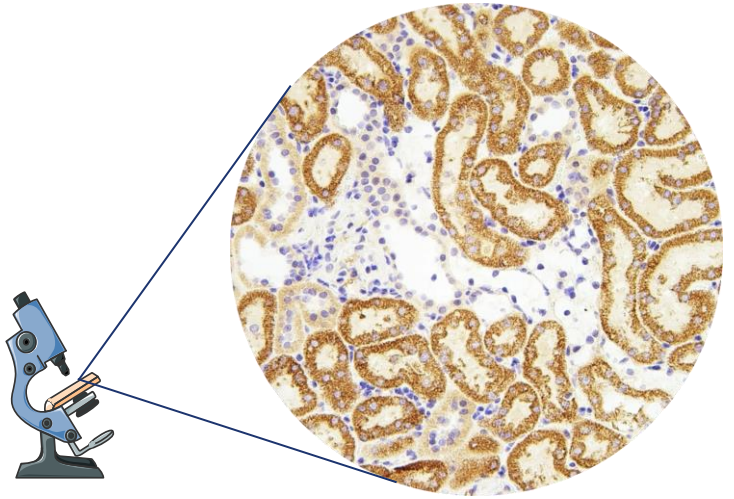
Investigating the Gastric GLP-1 level

Evaluating the correlation between GLP-1 expression levels and appetite in patients

quantify GLP-1 positive cells
in surgically removed gastric tissue samples



Immunohistochemical Staining (IHC)

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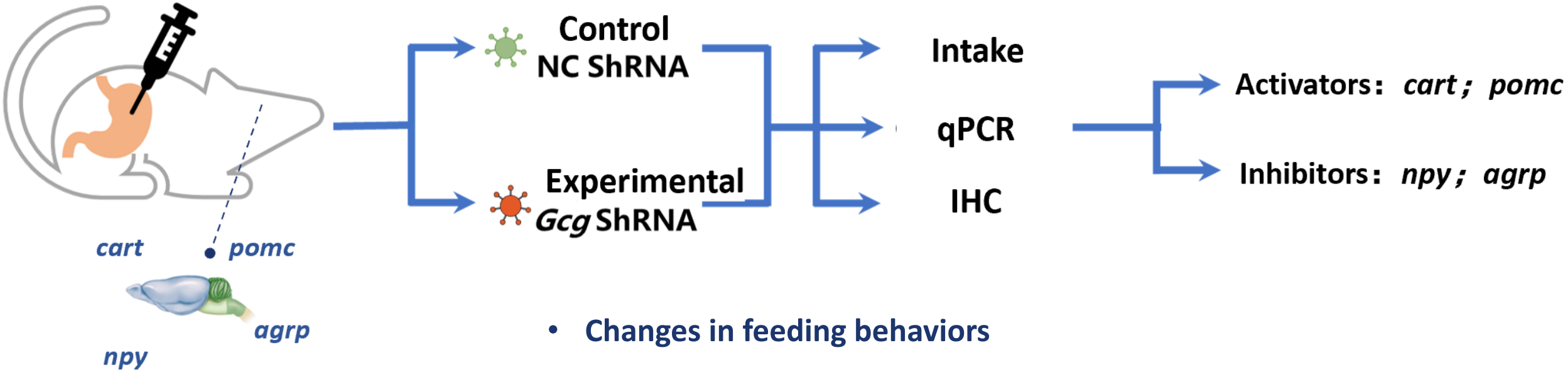
Experimental Approach



- Changes in feeding behaviors
- The expression of appetite-related factors in the hypothalamus (*cart, pomc, and npy, agrp*)

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PART 04

Research Results

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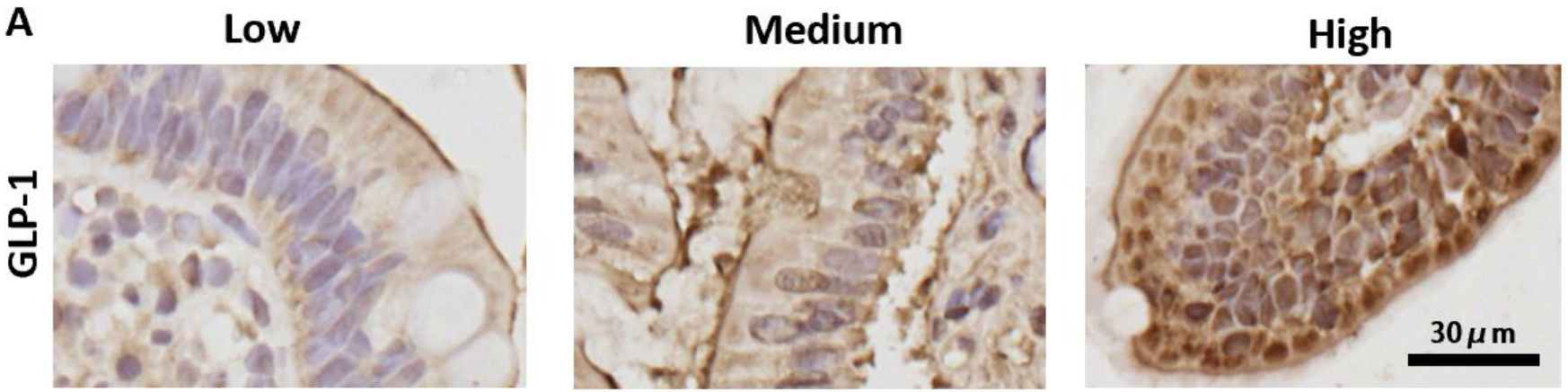
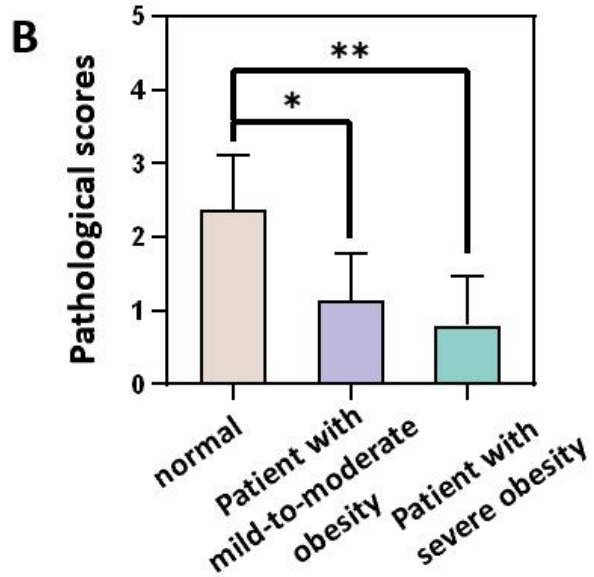
1.Changes in Gastric GLP-1 Positive Cell Count and Appetite Traits





A significant different in the number of GLP- 1 positive cells in the gastric mucosa;

Negative correlation

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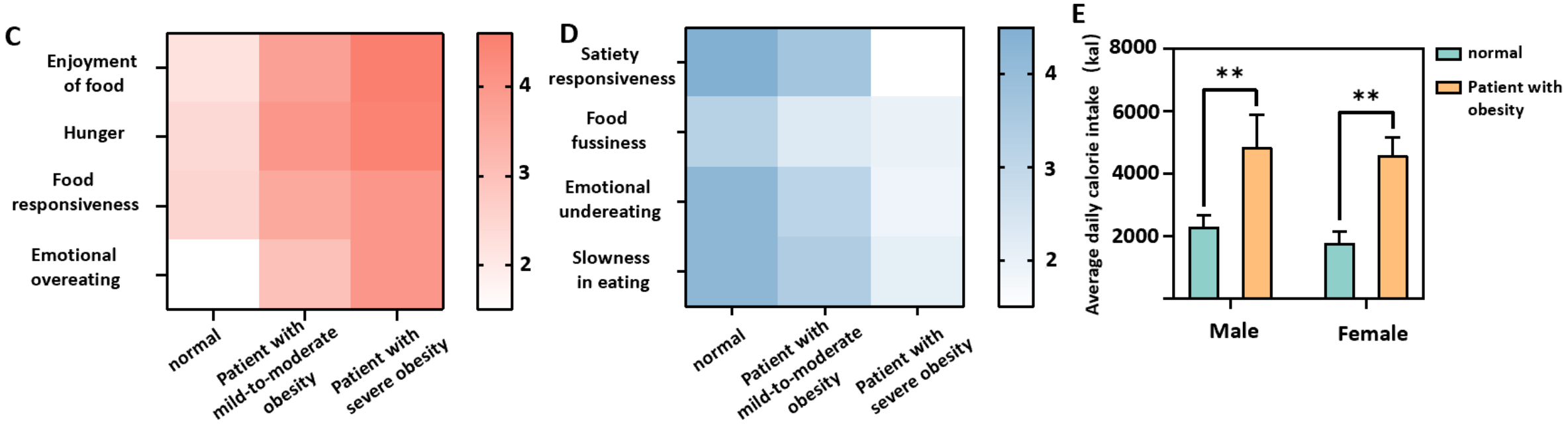
1.Changes in Gastric GLP-1 Positive Cell Count and Appetite Traits



An increase in food approach traits
A decrease in food avoidance traits

Average daily calorie intake

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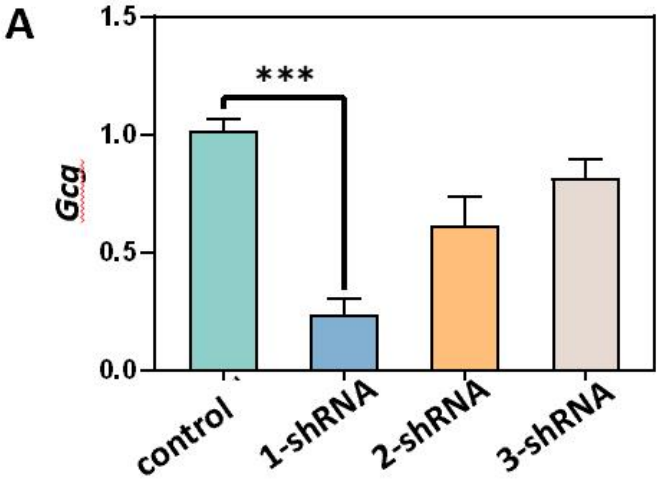
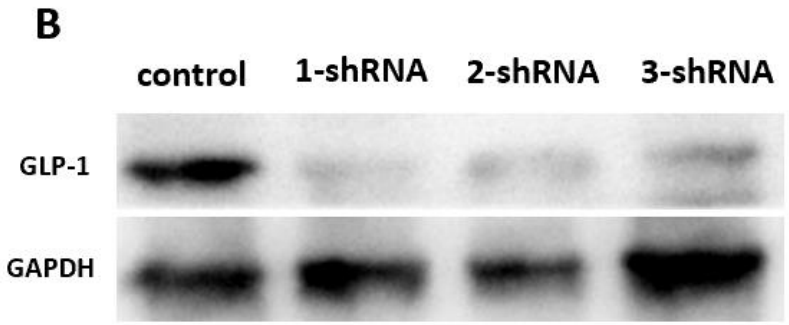
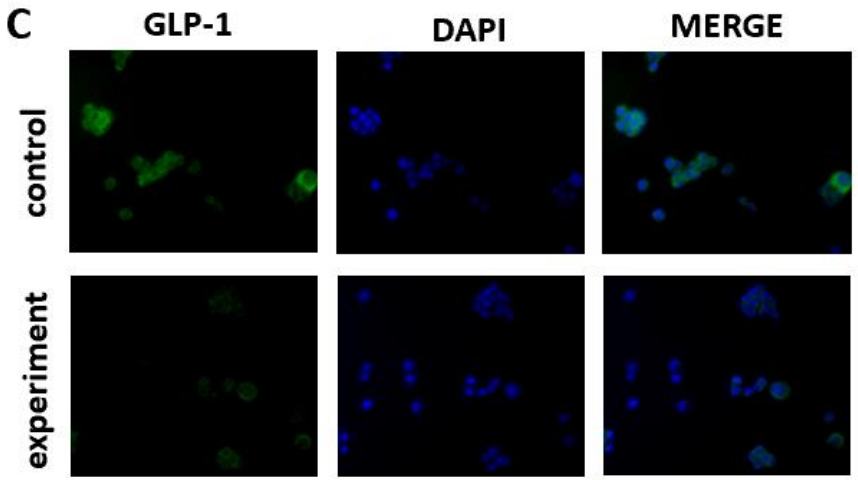
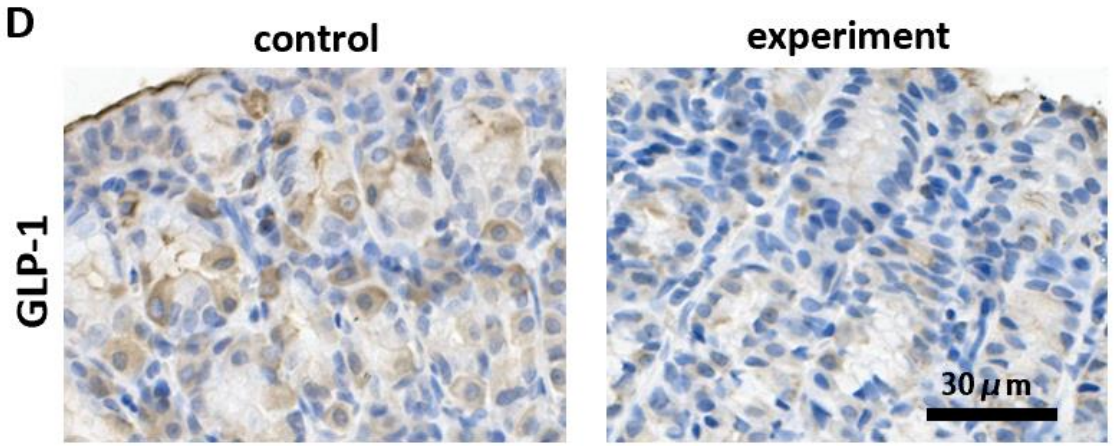
2.Experimental Model Findings





GLP-1 low expression model





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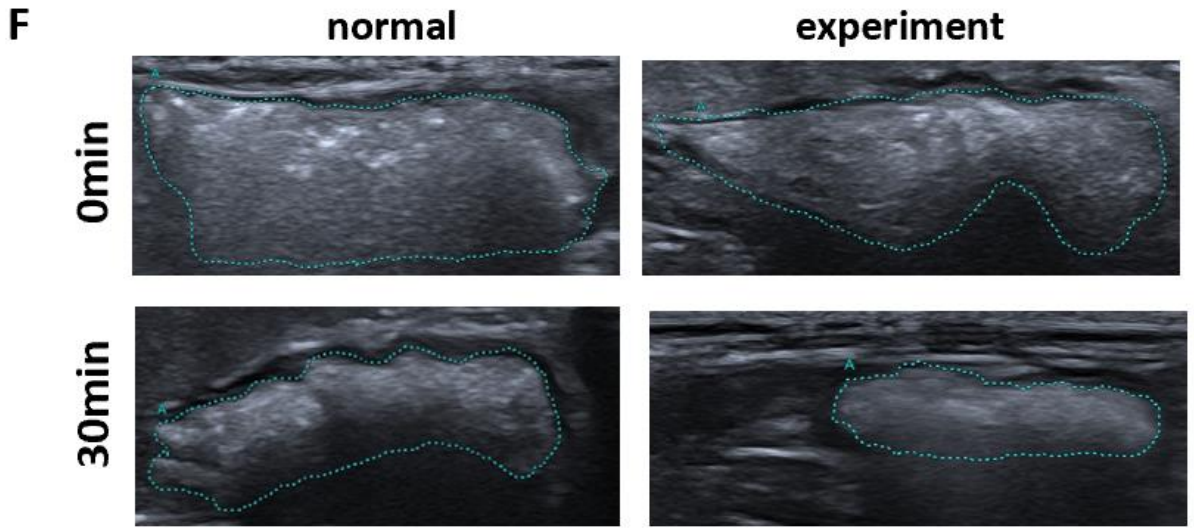
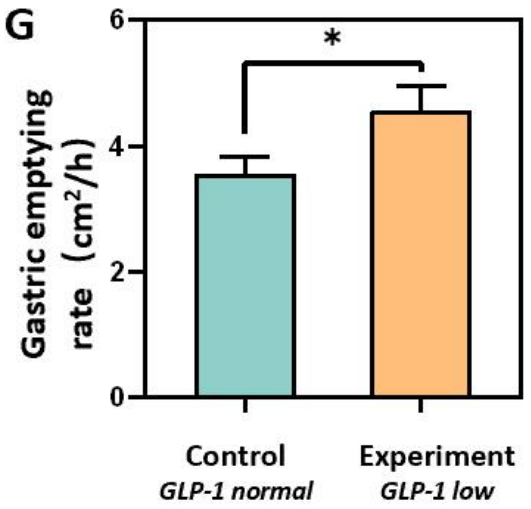
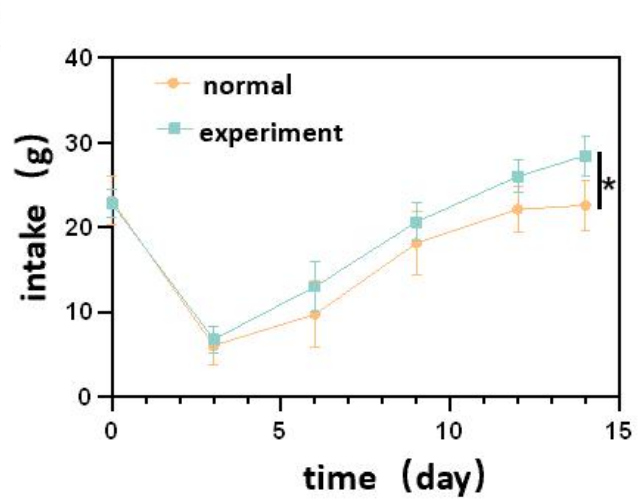
2.Experimental Model Findings







GLP-1 low expression

- Increased Food Intake
- Increased Gastric Emptying

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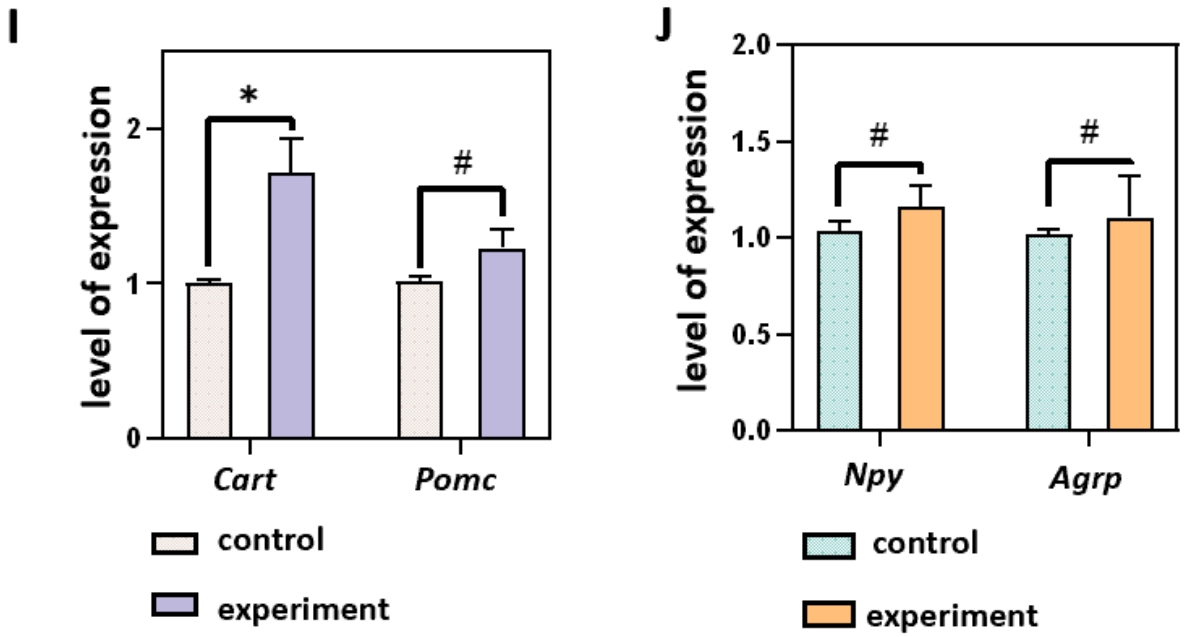
2.Experimental Model Findings



GLP-1 low expression

Increase in the expression of *Cart* in the hypothalamus

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PART 05

Conclusion

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Association Between Gastric GLP-1 Deficiency and Appetite Increase

1.A reduction in gastric- derived GLP-1 in the obese state is potentially associated with increased appetite;

2.Gastric-derived GLP-1 may be a new target for treating obesity

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Acknowledgment

中日友好医院
CHINA-JAPAN FRIENDSHIP HOSPITAL

减重糖尿病手术
健康管理中心

We look forward to more co-operation!

Contact me

wsqi@pku.edu.cn