

# Gut Hormones and Diabetes

## Ominous Octet - The 8 core defects of diabetes

There are 8 core defects that can affect blood sugar levels (Figure 1). All of the different parts work together to keep your blood sugar under control. If one of the parts does not work properly, the other parts are affected, causing hyperglycemia. Over a period of time, it may lead to diabetes complications such as cardiovascular disease, nerve damage, kidney damage, foot damage, and eye damage.

## Role of GLP-1

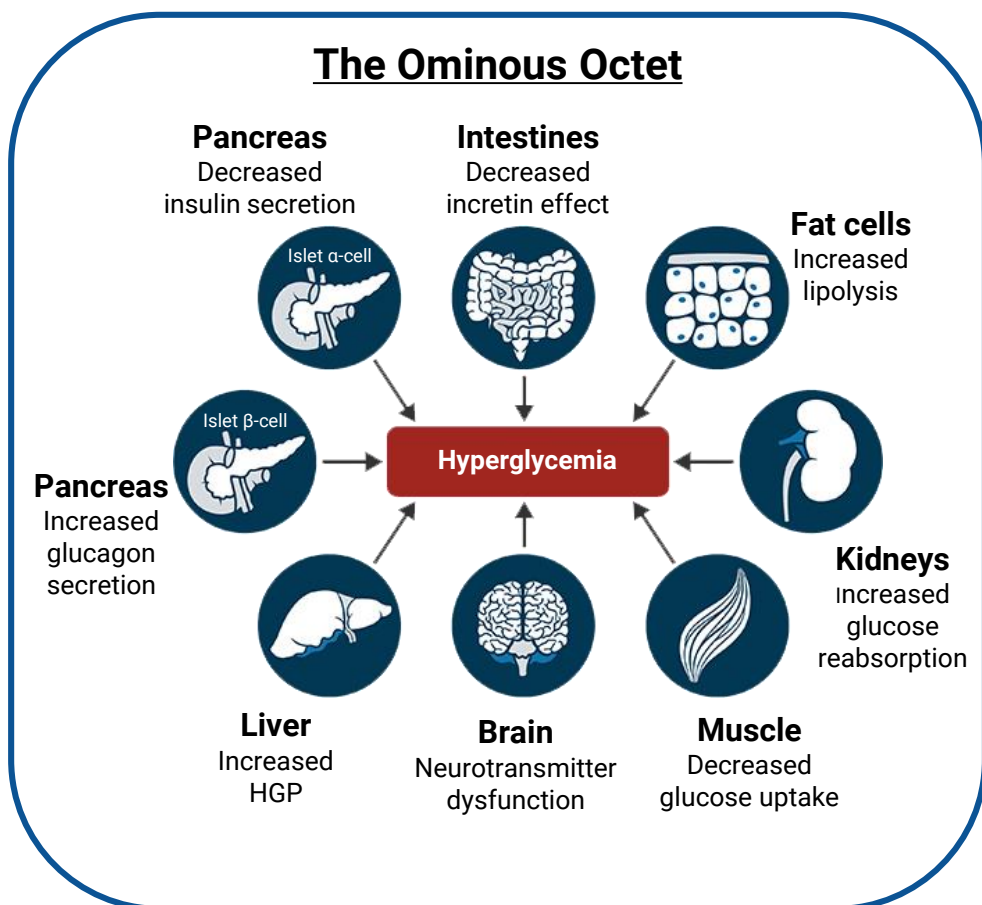
When we eat, our blood sugar rises. GLP-1 acts directly on the stomach, pancreas, liver, brain and muscles. It signals the organs to keep blood sugar in balance. However, evidence shows that people with type 2 diabetes have reduced incretin effects, which means they have fewer incretin hormones such as the glucagon-like peptide (GLP-1).

## Functions of GLP-1

1. Slows down how quickly food leaves the stomach (stomach)
2. Promotes insulin secretion to contact with glucose after meals (pancreas)
3. Lowers hepatic glucose output (liver)
4. Suppresses appetite (brain)
5. Increases glucose uptake (muscles)

## Increase GLP-1 through diet:

- Avoid or minimize sugar
- Reduce carbohydrates
- Eat enriched protein foods: fish, whey protein, yogurt
- Choose anti-inflammatory ingredients; turmeric, onion, citrus fruits, tomatoes
- Leafy greens: spinach, kale, collards
- Probiotics: yogurt, kimchi, miso soup, kombucha
- Eat foods rich in omega 3 fatty acids: salmon, chia seeds
- Eat high fiber foods: beans, whole wheat
- Eat antioxidants: berries, nuts



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# 關於胰島素和糖尿病您需要了解的知識

## 凶兆八重奏 — 八個影響糖尿病的因素

影響血糖水平的主要因素有八個（如下圖所示）。通過不同的身體機制共同作用能使您的血糖水平受到控制。當其中一部機制不能正常工作時，其他部分就會受到影響，從而導致高血糖。隨著時間流逝，可能導致一系列糖尿病併發症，如心血管疾病，神經損傷，腎臟損傷，腳部損傷和眼部損傷。

## GLP-1的作用

當我們吃東西時，血糖會上升。GLP-1能直接作用於胃、胰腺、肝臟、腦和肌肉。它發送信息通知器官來操作從而保持血糖平衡。然而，有證據表明，患有2型糖尿病的人的腸促胰島素作用降低，這意味著他們具有較少的腸促胰島素激素，如胰高血糖素樣肽（GLP-1）

## GLP-1的功能

1. 減慢食物離開胃的速度（胃）
2. 促進胰島素分泌以穩定血糖（胰腺）
3. 抑制肝糖輸出（肝臟）
4. 抑制食欲（大腦）
5. 促進肌肉細胞對葡萄糖的攝取（肌肉）

## 通過飲食增加GLP-1：

- 避免或減少攝取糖分
- 減少碳水化合物攝入
- 吃富含蛋白質的食物：魚，乳清蛋白，酸奶
- 選擇有消炎作用的食物：薑黃，洋蔥，柑橘類水果，西紅柿
- 綠葉蔬菜：菠菜，羽衣甘藍
- 補充益生菌：酸奶，泡菜，味噌湯，康普茶
- 富含歐米伽3脂肪酸的食物：三文魚，奇亞籽
- 高纖維食品：豆類，全麥
- 吃抗氧化的食品：漿果，堅果

## 糖尿病的凶兆八重奏

