

Besides lowering blood sugar, GLP-1 RAs can also slow down stomach emptying and make people feel fuller by acting on the central nervous system, which helps control blood sugar and manage weight (Maple-Brown et al., 2022). The glucose-dependent hypoglycemic characteristics of GLP-1 RAs have obvious advantages in the treatment of type 2 diabetes (T2D), and can effectively reduce hyperglycemic levels without increasing the frequency of hypoglycemia. Its good safety and regulatory ability for multiple metabolic links have gradually made it an important component of the current diabetes drug treatment system (Hamed et al., 2024).

3.2 Preferred regimens for overweight or obese T2D patients

For overweight or obese patients with type 2 diabetes, GLP-1 RAs is clinically important. Such drugs can usually reduce body weight and glycated hemoglobin (HbA1c) simultaneously (Hamed et al., 2024; Yao et al., 2024). Many clinical studies have shown that its weight loss effect is generally better than that of most traditional hypoglycemic drugs. Because GLP-1 RAs can manage both blood glucose and body weight simultaneously, it helps improve overall metabolism and reduce the risk of related complications (Wen et al., 2025).

In current clinical practice guidelines, GLP-1 RAs is gradually recommended for the population with diabetes mellitus complicated with obesity, especially for patients requiring weight intervention or cardiovascular risk management (Wen et al., 2025). Some preparations are administered once a week. The administration frequency is low and the operation is simple, which is conducive to improving treatment compliance and supporting long-term standardized treatment (Maple-Brown et al., 2022).

3.3 Combined treatment strategy

In clinical treatment, in order to improve metabolic status, GLP-1 RAs is often used in combination with other hypoglycemic drugs, among which metformin and SGLT2 inhibitors are the most common (Anderson, 2020; Gourdy et al., 2023). Metformin is a basic drug for treating type 2 diabetes, with stable effects and good safety. When used in combination with GLP-1 RAs, it can lead to better blood sugar control, contribute to weight loss, and the risk of hypoglycemia does not increase significantly (Maple-Brown et al., 2022).

When GLP-1 RAs is used in combination with SGLT2 inhibitors, their modes of action complement each other, and a better superimposed effect can be produced in terms of weight control, blood pressure reduction and cardiovascular protection (Anderson, 2020). The study by Gourdy et al. (2023) pointed out that this combination regimen is helpful for patients with type 2 diabetes who have a higher risk of cardiovascular or kidney disease, or whose metabolic response is not good after monotherapy. Therefore, choosing an appropriate combination medication regimen based on the specific condition of the patient is a key approach to enhancing the therapeutic effect.

4 Weight Loss Mechanism

4.1 Enhance satiety and reduce food intake

The weight loss effect of GLP-1 receptor agonists (GLP-1 RAs) is mainly related to the area of the brain that controls diet. When drugs pass through the bloodstream and stimulate the nerves in the brain, they activate specific receptors in the hypothalamus and brainstem that control the feelings of hunger and fullness. By altering neural signals, patients are more likely to feel full, have a reduced appetite and a decreased total food intake (Figure 1) (Bednarz et al., 2022; O Olukorode et al., 2024; Moiz et al., 2025). More in-depth research has found that such drugs can also affect the brain's reward system, making patients less likely to crave high-calorie foods and reducing the behavior of eating out of craving. This is very helpful for long-term weight control in patients with diabetes and obesity (Zhao et al., 2021; Fadel et al., 2025; Ilias et al., 2025; West et al., 2025).

Different GLP-1 RAs can significantly inhibit appetite (Zhao et al., 2021; Moiz et al., 2025; Fadel et al., 2025). This effect is not only due to the slower gastric emptying, but more importantly, it directly affects the pathways in the brain that control diet. Patients usually feel fuller and less hungry when taking the medicine, which is consistent with the weight loss observed in clinical trials and actual use (Bednarz et al., 2022; O Olukorode et al., 2024; Ilias et al., 2025; West et al., 2025).