

Behavioral interventions may be as effective at reducing food intake as anorectic drugs

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Simulations predict that behavioral interventions such as imposing strict no-food restrictions after meals can be as effective as strong anorectic drugs in reducing food intake in rodents, according to a study published

December 5 in the open-access journal *PLOS Biology* by Tom McGrath, Kevin Murphy and Nick Jones of Imperial College London, and colleagues.

A better understanding of feeding behavior is critical for addressing obesity and [metabolic syndrome](#), but there is a lack of a standard model that captures the complexity of feeding behavior. In their new study, McGrath, Murphy, Jones and colleagues constructed an accurate mathematical model of rodent feeding to examine the effects of fullness on feeding behavior and how this is modulated by anorectic agents, fasting, and the day/night cycle.

The researchers validated their model and used it on a substantial dataset of rat feeding behavior under a wide variety of conditions. The researchers identified novel mechanisms of the behavioral effects of anorectic drugs (such as PYY3-36, lithium chloride, GLP-1 and leptin), and investigated how behavioral interventions can combine with anorectic drug administration to robustly reduce [food intake](#).

The results suggest that introducing a strict minimum interval between meals or modulating the rate of upper-gut emptying (for instance, by changing the composition of [food](#)) can be as effective as administering anorectic drugs. The authors found that it was possible to improve food-intake reduction by optimizing drug administration, but the gains were relatively small. For example, enforcing a 45-minute post-meal period (for rodents) during which food was not available, or a 20% decrease in gut motility, were both as effective at reducing food intake over a 12-hour period as a high dose of the anorectic [drug](#) PYY3-36, highlighting the potential of alternative interventions to reduce food intake. Although a direct comparison with humans is difficult to make, these results suggest that changes to diet—particularly changes that slow gut emptying—might be a strong strategy for [weight loss](#).

"The surprise for us," said Nick Jones, "was both that a relatively simple model of feeding, which hinges on a notion of fullness, was so predictive of the complex feeding patterns of individual rodents. We further hadn't anticipated that the effects of anorectic agents could be mimicked with such mild [behavioral interventions](#)."

More information: Thomas M. McGrath et al, The homeostatic dynamics of feeding behaviour identify novel mechanisms of anorectic agents, *PLOS Biology* (2019). [DOI: 10.1371/journal.pbio.3000482](https://doi.org/10.1371/journal.pbio.3000482)

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