



## **Microbiome-Based Prediction, Diagnosis, and Treatment of Relapsing Obesity**

(No. T4-1805)

### **Principal investigator**

**Eran Elinav**

Faculty of Biology  
Department of Systems Immunology

### **Principal investigator**

**Eran Segal**

Faculty of Mathematics and Computer Science  
Department of Computer Science and Applied Mathematics

## **Overview**

A novel gut microbiome-based method has been developed to predict and prevent weight regain after weight loss. This approach utilizes a personalized machine-learning algorithm to analyze gut microbiome composition, identify individuals at higher risk of regaining weight, and offer targeted interventions to sustain weight loss by modulating the gut microbiome.

## **Applications**

- **Predictive Diagnostic Tool:** Provides a microbiome-based test to identify individuals at high risk of post-diet weight regain.
- **Therapeutic Interventions:** Offers potential treatments, such as microbiome modulation, to prevent weight regain and support long-term weight maintenance.

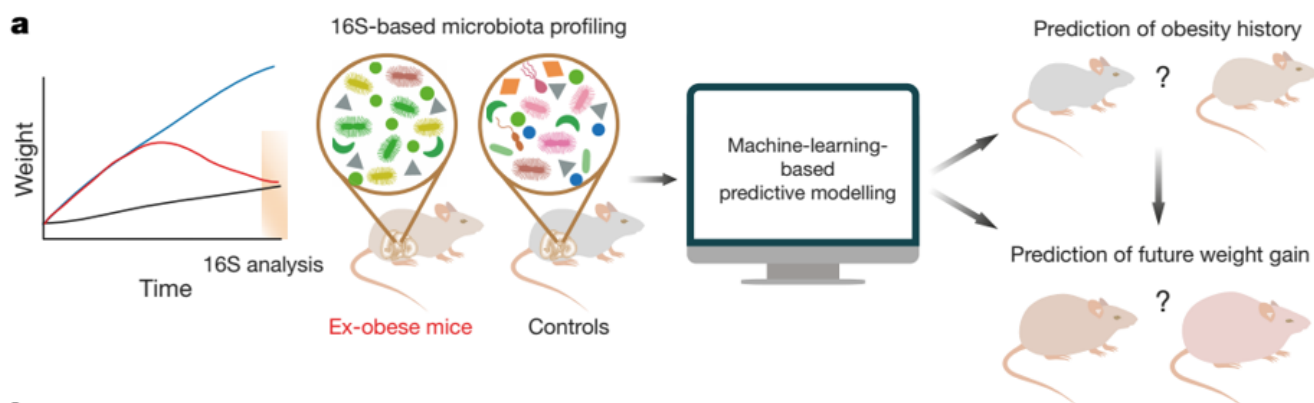
## **Advantages**

- **Personalized Approach:** Uses a machine-learning algorithm tailored to individual microbiome profiles for more accurate predictions and interventions.
- **Sustainable Weight Maintenance:** Focuses on microbiome modulation rather than repeated dieting, reducing the risk of relapsing obesity and its associated health complications.
- **Microbiome-centered approach:** Provides a potential method for weight management, potentially reducing the need for medications with side effects.

## **Stage of Development**

A personalized machine-learning algorithm for predicting weight regain based on gut microbiome profiles was developed and validated. Fecal transplants and post-biotic treatments have shown promise in preventing recurrent weight gain in a mouse model. This research has been published in [Nature](#) [1], and

further studies are planned to advance the technology for clinical use.



Schematic of microbiota-based prediction of weight-gain history and weight regain upon HFD feeding.

## References

[Thaiss](#) [1], C., Itav, S., Rothschild, D., et al. Novel gut microbiome-based method to predict and prevent weight regain after weight loss. *Nature* 540, 544–551 (2016).

## Patent Status

USA Granted: 12,161,679