**A Novel Method for Maintaining Target Body Weight Following Weight Loss Intervention Using Gut Microbiome Analysis**

Principal Investigators: Prof. Eran Elinav, Prof. Eran Segal. Yeda ref. 1781

Summary:

The past century has seen an overwhelming increase in prevalence obesity, with an estimate 44% of the adult population being overweight and about 10% suffering from morbid obesity. Obesity-related pathologies are strongly associated with risk factors for stroke, diabetes, high blood pressure, musculoskeletal disorders, and ischemic heart disease, the latter being considered a leading cause of overall mortality.

Despite continuous efforts to find a solution for the obesity epidemic, no dietary approach has been able to maintain prolonged weight reduction after the initial weight loss. Moreover, the recurrent weight gain usually exceeds that of the pre-weight loss intervention, irrespective of fitness level or genetic background. The health risks are further increased with each weight gain-loss cycle.

**Consequently, there is a strong need for the development of novel methods for weight loss and more importantly, for stopping relapsing obesity post-weight loss intervention.**

The groups of Prof. Eran Elinav and Prof. Eran Segal have identified a connection between the presence and amount of certain types of bacteria in the gut and the risk of obesity. Based on this observation they have developed a novel method for maintaining target body weight and analyzing the likelihood of weight regain following weight loss intervention based on gut microbiome analysis. This analysis can be used to provide personalized dietary recommendation to maintain the target weight.

Applications and Advantages:

* **Diagnostic to test which populations are more susceptible to relapsed obesity**
* **A method of either using an agent or a specific bacterial population to reduce relapsed obesity**

Technology's essence:

Profs. Elinav and Segal have discovered a link between certain types of bacteria in the gut and the tendency for obesity and post-diet/intervention weight regain. Based on these observations, the teams have developed a novel machine-learning algorithm that can analyze an individual's gut microbiome population and not only predict an individual's tendency for weight regain but also supply dietary recommendation for maintaining the target weight. Additionally, the teams have shown that the gut microbiome can be directly modulated, using different agents such as antibiotics, probiotics, and flavonoids to that of a non-obese individual, improving the results of potentially any weight loss program.