

1. Introduction

Obesity has grown to epidemic proportions during the past decades with a global prevalence that has nearly doubled between 1980 and 2014 (1). The cause of obesity is multi-factorial but changes in the environment seem to be the main driver (2). Obesity increases the risk of mortality and morbidity as it is associated with a range of diseases including type II diabetes and cardiovascular diseases (CVD) (1). Strategies for treatment of obesity and obesity-associated diseases include a range of innovative pharmaceutical, hormonal and device options as well as surgical procedures. However, dietary modulation is the main strategy applied as a part of primary and secondary prevention (3).

A range of dietary approaches have been investigated in the search for an optimal diet to improve the success of weight loss and weight loss maintenance (4). Large projects such as CARMEN, NUGENOB, PREDIMED, DIOGENES, DIRECT, LOOK AHEAD and POUNDS LOST as well as popular weight loss diets including Atkins, Ornish and Zone have been used to study which macronutrient composition, sometimes in combination with glycaemic index and physical activity, that yields the best results in the treatment of overweight and obesity. Yet, no perfect dietary macronutrient composition has reached consensus among worldwide experts, but the most promising result seem to be obtained from the beneficial effects of a high protein intake in combination with a fibre-rich diet (4). Currently, the PREVIEW project (5), which was initiated in 2013, tries to gain further insight into this dietary combination combined with different exercise strategies in the prevention of type II diabetes.

During the last decade, it has been observed that the gut microbiota, termed the “other genome”, affects host health to a larger extent than former envisioned. The microbiome research area advanced fast after the development of culture-independent techniques as well as the initiation of two large projects in 2008. The MetaHIT project (6) was one of the first internationally coordinated microbiome projects. Here, the aim was to establish associations between the genes of the human intestinal microbiota and health and disease with special focus on inflammatory bowel disease and obesity. Based on this, a reference catalogue of 3.3 million of human intestinal microbial genes was obtained (7). Furthermore, the Human Microbiome Project (HMP) (8) was established with the aim to characterise the microbial communities found at different sites on the human body, including the gastrointestinal tract, and analyse the role in health and disease. Today, there is consensus that alterations in the gut microbiota are associated with obesity and obesity-associated diseases, such as diabetes and CVD (9). However, a deeper understanding of how the host metabolism is affected by dietary modulation of the gut microbiota is necessary before microbiota-based dietary recommendations can be applied as a strategy for prevention and treatment of obesity and obesity-associated diseases.