

## Abstract

The prevalence of obesity and its related cardiometabolic complications in children remains high across the world. Obesity is a multifactorial disease caused by interaction between genes and environmental factors. Genome-wide association studies have discovered several single nucleotide polymorphisms associated with obesity. A causal role of infection in the pathogenesis of obesity has also been considered, particularly the role of adenovirus 36 (Adv36). The aim of the Ph.D. thesis was to investigate the associations of obesity susceptibility loci (*TMEM18*, *SH2B1*, *KCTD15*, *PCSK1*, *BDNF*, *SEC16B*, *MC4R*, *FTO*) and Adv36 infection with obesity-related characteristics and complications in the Czech adolescent population. The results are described in eight publications, of which six are original papers and two are reviews. Studies were performed on a cohort of Czech adolescents recruited either from the general population (1,533 individuals from the epidemiological study) and from in-patient or outpatient weight management clinics (562 overweight/obese individuals underwent an intervention). The results demonstrated an association of *TMEM18*, *SEC16B* and *FTO* gene variants with obesity. Some variants of the genes involved in hypothalamic regulation of energy homeostasis – *MC4R*, *BDNF*, *PCSK1* – were related to metabolic syndrome, individual nutrient intake or Adv36 infection. A relationship of Adv36 antibodies with obesity, and especially with overweight, was further confirmed. Moreover, Adv36 positivity was associated with the response to weight management. Conclusions of this Ph.D. thesis support the importance of genetic and infectious factors in the pathogenesis of obesity.