Cancer-associated cachexia (CAC) is a wasting syndrome characterized by body weight loss, atrophy of adipose tissue and skeletal muscle. The estimated prevalence of CAC is high, reaching in some reports 50–80%, and is particularly common in malignancies of the upper gastrointestinal tract, including gastric cancer. Cachexia leads to declining physical function, psychological distress, and has a detrimental effect on a patient's quality of life. Moreover, it is strongly associated with the risk of treatment-associated complications and patients' survival time, representing the direct cause of at least 20% of cancer-associated deaths. All these elements emphasize the social and economic costs of cachexia and substantiate further research in this area.

Recent animal studies suggested that activity of brown adipose tissue (BAT) may significantly contribute to metabolic changes associated some chronic disorders, like diabetes or obesity. Some experimental evidence additionally showed that the brown-like adipocytes (i.e. 'brite', multilocular and positive for uncoupling protein 1) that appear within some white adipose tissue (WAT) depots play also an important role for increased energy dissipation. We propose the general hypothesis that cancer-associated cachexia (CAC) is causally related to altered functional status of brite adipocytes resident in WAT by activating cellular pathways of increased energy expenditure and that activity of these adipocytes may be influenced by cancer cells. These assumptions will be verified in a population of patients with gastric cancer, i.e. malignancy that belongs to the most common causes cancer cachexia, and some additional in vitro experiments.

A combination of various high-throughput 'omics' technologies, including transcriptomic (mRNA, microRNA), and proteomic signatures, shall provide much more biologically relevant information than analyzing a predefined pathway with a focused approach. Therefore, the study is expected to broaden the current knowledge about CAC, and provide data for potential clinical applications to expand the current therapeutic spectrum.