Aims:

Cardiac surgery including coronary-artery bypass grafting (CABG) is associated with significant risk of neuropsychiatric complications (up to 50% of patients). Annually in Poland, 27.000 adult patients undergo this procedure. Unfortunately, despite successful surgery, even half of the individuals experience delirium which results in poorer prognosis and increased mortality.

Therefore, the objective of the current study is to assess which of the factors related to the mental and physical condition of participants, surgery, and anaesthetic procedures contribute the development of postoperative delirium. In this project, the role of stress markers, pro-inflammatory and genetic factors, brain metabolism and preoperative body composition in pathogenesis of postoperative delirium will be investigated.

Moreover, predictive and diagnostic value of aforementioned factors, as well as their impact on the final prognosis will be evaluated.

Methodology:

We plan to include in the study 200 patients scheduled for elective CABG, admitted to the Cardiac Surgery Department, Medical University of Lodz. The subjects will be examined on the day prior to the scheduled operation with regard to the cognitive functioning and the presence of major depression and anxiety disorders. Furthermore, quality and satisfactory of life will be evaluated with the use of selected questionnaires.

The saliva samples for cortisol, and venous blood samples for cortisol, catecholamines, oxidative stress markers, inflammatory and genetic polymorphisms will be taken the day prior the surgery (baseline measurement). The DXA device will be used to assess the patients' body composition before surgery and to correlate above variables with the risk of delirium and death after surgery. During the surgery, cortical perfusion will be assessed with the use of oximetric electrodes, moreover, surgery- and anaesthesia-related variables will be recorded. Above variables will be included into univariate and multivariate statistical analysis to reveal the factors independently associated with postoperative delirium. The prevalence and severity of delirium will be assessed with the use selected scales and delirium criteria. The saliva and plasma samples will be taken again for biomarkers measurement. The group of 10 patients will be evaluated with PET in the course of delirium and 3 months after the delirium resolution. Mortality rate and the number of complications will be assessed in delirium and non-delirium cases on the discharge and 6 months after the discharge from the hospital. In addition, 6 months after hospitalization quality and satisfaction of life will be assessed in the above groups of individuals.