Acute pulmonary embolism (APE) is a leading cause of cardiovascular mortality, exceeded only by stroke and myocardial infarction. The clinical presentation of acute pulmonary embolism ranges from asymptomatic and incidentally discovered to massive pulmonary embolism causing cardiogenic shock and death. About 40 – 60% of patients who survive acute pulmonary embolism develop persistent symptoms of exercise intolerance, dyspnea and depressive disorders, making pulmonary embolism an important cause of disability. “Post-PE syndrome” has been used to refer to persistent dyspnea, exercise limitation, and impaired quality of life that persists for longer than 3 months after effective anticoagulation for acute pulmonary embolism. About 15% of patients after APE are diagnosed with depressive disorders. However, the pathogenesis of post pulmonary embolism syndrome remains unknown.

In recent years, it has became evident that inflammation plays a pivotal role in the development of depressive disorders and cardiovascular diseases such as atherosclerosis, coronary artery disease, stroke. In this context, a novel insights into the molecular mechanisms driving these diseases show that metabolism of tryptophan, via the kynurenine pathway, is a checkpoint influencing inflammation as well as controlling synaptic plasticity and memory function. Clinical and basic science data suggest relationship between kynurenine pathway, immunity and depressive disorders. Whether kynurenine pathway can regulate pulmonary embolism course, post pulmonary embolism syndrome and depressive disorders remains unknown.

The planned study will allow to compare the kynurenine pathway metabolites and inflammatory state in 150 patients with acute pulmonary embolism syndrome and in 3 months of anticoagulation treatment. Moreover, the project will enable to verify prospectively if the kynurenine pathway activity is related to depressive disorders development and to correlate these observations with inflammatory state. In addition, the precise clinical assessment and exercise tolerance will be performed.

This is the first study analyzing the relationship between inflammation, kynurenine pathway activity, pulmonary embolism clinical picture and depressive disorders during post pulmonary embolism syndrome. Better understanding of the molecular mechanisms involved in the crosstalk of these systems will help guide better clinical management of pulmonary embolism patients in the future, as well as the discovery of new potential therapeutic targets in the future.