Analysis of circulating microRNAs in patients in the acute phase of ischemic stroke: phenotypic characterization of the cohort recruited

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Introduction and Hypothesis: Stroke is one of the most common causes of death or disability worldwide. MicroRNAs are small noncoding RNAs molecules that have been described as potential biomarkers in several diseases, mainly due to their ability to regulate gene expression. Studies have demonstrated that altered pattern of microRNA expression could influence disease progression and prognosis. Considering that there are different pathophysiological pathways for brain damage and recovery in ischemic stroke we hypothesize that differential regulation of microRNA expression could be linked to the prognosis.

Objective: The aim of this study is to determine plasma microRNAs expression in the acute and chronic phases of ischemic stroke and to correlate it with the prognosis of patients.

Methods: This study will evaluate a total of 50 patients with ischemic stroke. Plasma samples were collected in two periods: up to 24 hours after the stroke ictus (acute phase) and 6 months after the ischemic event (chronic phase). MicroRNAs will be extracted from plasma samples using miRvana Paris kit (Illumina, Inc). Subsequently we will determine microRNA profile using small-RNA Sequence technique. Sequencing libraries will be prepared using TruSeq® Small RNA Library Prep kit – RS-200-0048 (Illumina, Inc) and sequenced in a MiSeq System (Illumina, Inc). Reads will be counted using HTSeqcount and Feature counts software. Then, we will analyze differential expression patterns using DEseq2 and mirDeep softwares. The relevant results will be compared with clinical data, neuroimaging evaluation, risk factors and ischemic stroke subtypes.

Results: To date we have recruited patients, 51% are males, with average age of 65.8 years old (+/- 13 years). Their main risk factors presented by the patients are hypertension (66%), diabetes (46%) and smoking (9%).

Relevance: At the end of our study we hope to be able to identify circulating microRNAs that can be used as a non-invasive biomarker of prognosis in patients with ischemic stroke. These may help to better tailor treatment strategies in the acute phase of ischemic stroke in order to improve recovery rates.

References: [1] Sepramaniam, S et al, Int. J. Mol. Sci. 15: 1418-32,2014; [2] Vemuganti, R. Neurochemistry International 63: 438–449,2013; [3] Dobkin and Carmichael. Neurorehabilitation and Neural Repair. 30, 2015.