

# **The SV2A protein: Imaging synaptic density during the progression of the temporal lobe epilepsy in the KASE rat model**

**Paper ID** 1453

Submitted by Maria Elisa Serrano Navacerrada

## **Authors**

M. Serrano Navacerrada (Université de Liège) Presenter

M. Bahri (Université de Liège)

G. Becker (Université de Liège)

F. Mievis (Université de Liège)

F. Giacomelli (Université de Liège)

L. Christian (Université de Liège)

A. Luxen (Université de Liège)

E. Salmon (Université de Liège)

A. Plenevaux (Université de Liège)

## **Abstract text**

### **Introduction**

The temporal lobe epilepsy (TLE) is the most common epileptic disorder. New antiepileptic drugs target the Synaptic Vesicle protein 2A (SV2A). Nevertheless, the prevailing literature addressing the relation between this protein and the epilepsy is limited.

This study provides insights on the role of the SV2A protein during the four stages of TLE, throughout its in vivo study with the [18F]UCB-H radiotracer.

### **Methods**

Twenty-four male Sprague-Dawley were subjected to multiple injections of i) Saline (Sham), or ii) 5mg/kg of Kainic Acid (KA). The rats not reacting to KA (NKA) were also scanned. In each TLE stages, a [18F]UCB-H dynamic scan was performed, followed by a T2-structural MRI. EEG recordings were performed to determine the number of crises. Data processing was done with PMOD 3.6. Results were expressed as SUV and statistically analyzed with the SPSS and the SPM.

### **Results**

During the acute phase, statistically significant differences were found between Sham and KA in striatum, cerebellum, and medulla. In the latent phase, these SUV differences were detected between the NKA and KA in the same regions along with hippocampus and thalamus. When the spontaneous crises started, these group differences became statistically significant in all the regions but the cortex. During the chronic phase, all the regions showed statistically significant differences between groups. Furthermore, the voxel-wise analysis highlighted statistically significant differences in voxels at the level of amygdala and hippocampus.

### **Conclusions**

These results show that [18F]UCB-H is able to detect early modifications in SV2A expression (3 days after the TLE model creation), in particular in regions implicated in the epileptic process. This radiotracer can potentially be used as a suitable biomarker for the early detection of the epileptic disease, being able to distinguish between stages in this neurodegenerative disease.