IN VIVO STUDY OF THE SV2A PROTEIN IN AN EPILEPTIC RAT MODEL

ME. Serrano, G. Becker, MA. Bahri, C. Warnier, Joël Aerts, F. Mievis, F. Giacomelli, Ch. Lemaire, E. Salmon, A. Luxen, A. Plenevaux

GIGA-CRC In vivo Imaging, Université de Liège (Ulg), Liège, Belgique

meserrano@ulg.ac.be

**Introduction**

Epilepsy is one of the commonest neurological disorders, affecting more than 60 million people worldwide [1]. New and effective antiepileptic drugs mainly target the SV2A protein [2] but its actual role is still largely unknown. [18F]UCB-H was developed as a tool to study in vivo the brain expression of this isoform [3, 4]. Due to the fact that only post-mortem studies were reported so far [5] the present pilot study was undertaken in order to evaluate for the first time in vivo in rats the SV2A expression in the validated Kaïnic Acid (KA) epilepsy model [6].

**Methods**

Three male Sprague-Dawley were used, one injected with saline (Sham) and two with multiple KA systemic injections (5mg/kg x 3) [9]. SV2A brain levels were estimated at day 75, when spontaneous seizures started to appear. Animals were anesthetized (2.5 to 3 % isoflurane), and scanned for 1 hour with [18F]UCB-H (41 ± 5 MBq IV tail vein) in a Focus 120 microPET system and with MRI (9.4T Agilent, anatomical T2). Coregistration was done with PMOD 3.6 software. Data were expressed in SUV and areas under the curve were calculated for the different regions.

**Results**

[18F]UCB-H microPET images showed an important reduction (20-30%) for SV2A after KA injections mainly localized in amygdala, hippocampus, lateral parietal association cortex and cingulate cortex. The rest of the brain was globally unchanged. MRI revealed atrophy and inflammation in amygdala and hippocampus.

**Conclusions**

These preliminary results in KA treated rats presenting spontaneous seizures showed that [18F]UCB-H microPET was able to detect important reductions for the SV2A proteins in relevant regions for epilepsy [5]. Accordingly to this, we can infer that the KA model in rats deserves for further development and validation as a tool for the study of epilepsy. [18F]UCB-H appears as a valuable tool to follow in vivo SV2A proteins through longitudinal protocols and in turn to better understand its actual role in epilepsy.

**References/acknowledgements**

This work was funded by University of Liège, F.R.S.-FNRS, Walloon Region and UCB Pharma. Alain Plenevaux is research director from F.R.S.-FNRS. [1] Alexopoulos, Epileptology, 2004 [2] Hamann et al., Eur J Pharmacol, 2008 [3] Bretin et al., Molecular Imaging and Biology, 2015 [4] Warnock et al., J Nucl Med., 2014 [5] Wang et al., J Mol Neurosci., 2014 [6] Hellier et al., Epilepsy Res., 1998

**Figure (optional)**

SV2A levels and brain structure in Sham and KA rats with [18F]UCB-H and T2-weighted MRI respectively

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